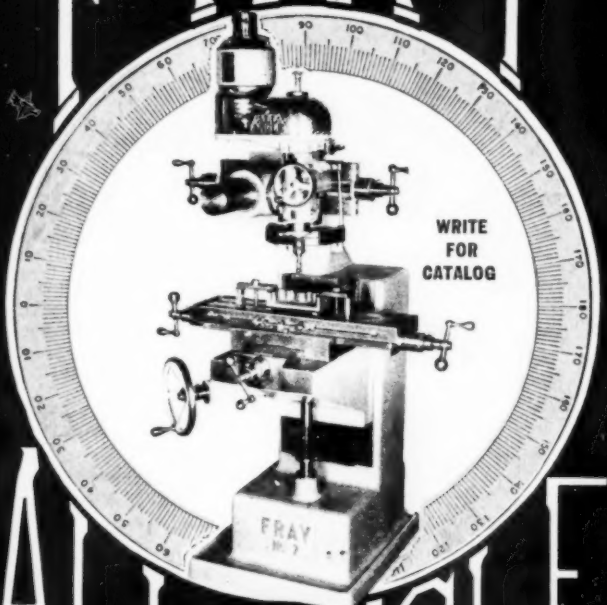
# MACHINE TOOL Blue Book

JANUARY 1941


FRAY

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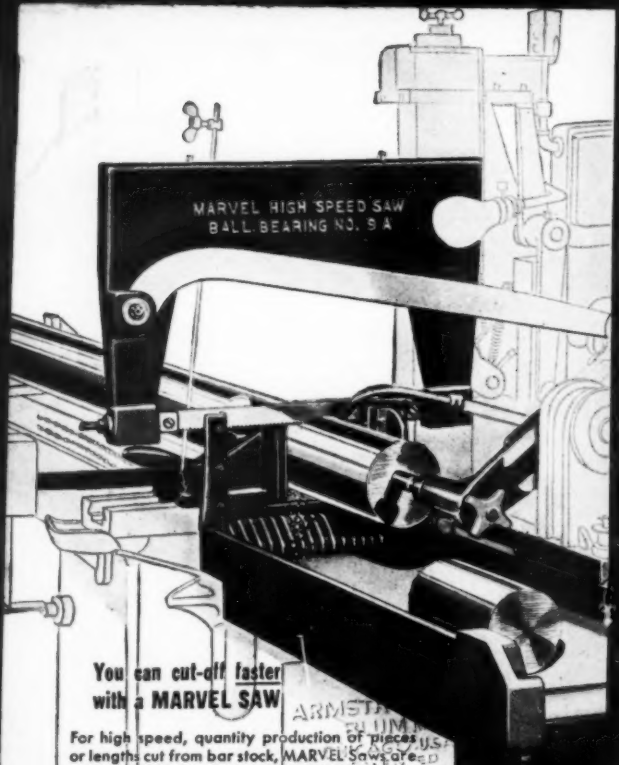


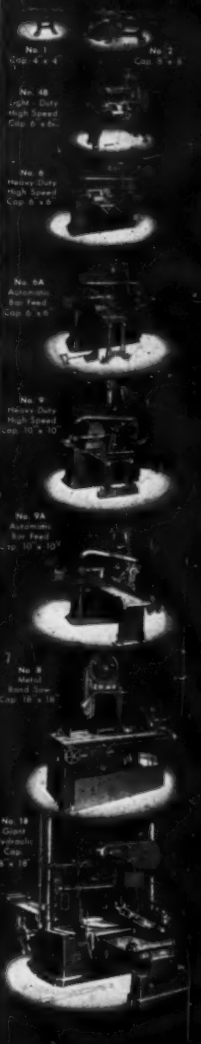

## You can cut-off faster with a MARVEL SAW

For high speed, quantity production of pieces or lengths cut from bar stock, MARVEL Saws are unequalled. These heavy-duty all-ball-bearing sawing machines, with automatic bar push-up require no more attention than an automatic screw machine, yet produce more pieces per hour, floor-to-floor than any other cutting-off method.

They set new standards for fast cutting-off with accuracy and low cost per piece, on thin slices (as gear blanks) or long lengths (as rifle barrels).

These high speed "automatic" saws come in two sizes: MARVEL No. 6A, Capacity 6"x6", and MARVEL No. 9A, Capacity 10"x10". With the other MARVEL Saws, they comprise the most complete line built—a line that provides exactly suited saws for every purpose.

**MARVEL SAWS**

**ARMSTRONG-BLUM MFG. CO.**
**"The Hack Saw People" 5700 Bloomingdale Ave., Chicago, U.S.A.**
**Eastern Sales Office: 199 Lafayette St., New York, New York**

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## with HOBART "Simplifie

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Delays are expensive, rejects costly! You can't afford to take chances with slow production welding when every minute lost means dollars. With Hobart it's a easy matter to produce better quality welds with greater speed. Exclusive Hobart features of the new Hobart Multi-Range Arc Welder guarantee top performance! Remote Control saves time and labor; Multi-Range Dual Control lets you select the correct welding heat from 1000 combinations of voltage and welding current. Get more profit by completing important production schedules in less time with a Hobart! Use coupon for details.

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*"One of the World's Largest Builders of Arc Welders"*

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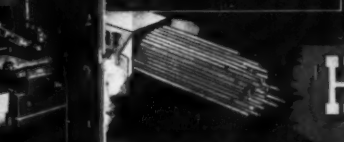
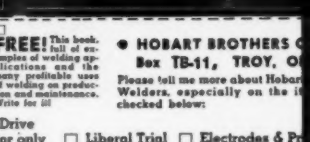
your own work prove it pays!

GET YOUR ORDER IN NOW to Get Delivery

**Welds Faster!** **Welds Easier!** **Fewer Rejects!**





**HOBART**

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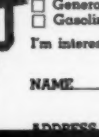

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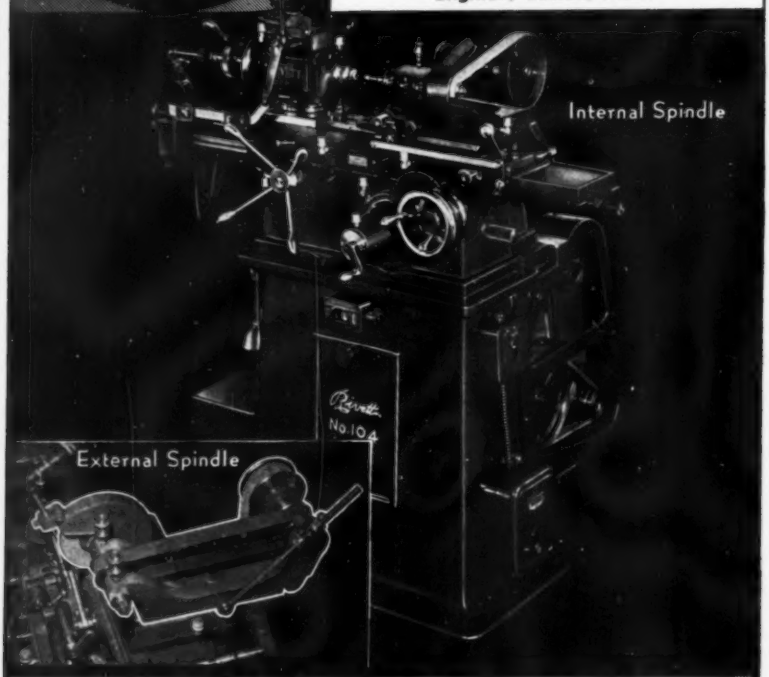
# MORE PRECISION WORK

## On Rivett 104

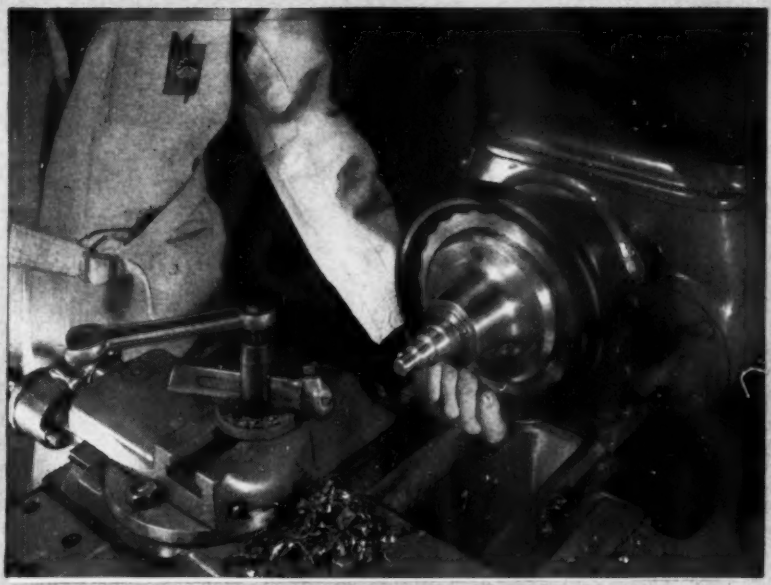
With interchangeable spindles for internal and external grinding you are always ready for **MORE PRECISION WORK** whether it be in the toolroom or on small lot production. The ease of set-up, wide range of adjustment and high spindle speeds have built the fame of "104" as a "work-getter" throughout this country and abroad

*Write for Bulletin 104C*

**RIVETT LATHE & GRINDER INC.**
**Brighton, Boston, Mass.**




# RIVETT



# BE MODERN... equip your machines with SJOGREN SPEED COLLET CHUCKS

The use of Sjogren Speed Collet Chucks is a modern trend toward greater profit. They do away with old style draw spindles and adapters which cut down the collet capacity and, with the hand wheel operated Sjogren Speed Collet Chucks, *the operator is always in front of his work and he stays there!* There is no need to reach over—or to walk back of the lathe headstock—to grip or release material in the collet.

Available in three sizes: 1", 1⅜" and 1¾" capacity for threaded, taper key drive or cam lock spindle noses.

**Furnished with Hardinge Precision Collets.**

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| Hardinge Sales Company, Inc. | 277 Lafayette Street | New York, New York |
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| Colcord Wright Mchy. & Supply Co. | 1223-1229 N. Broadway | St. Louis, Missouri |
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| Moore Machinery Company | 550 Fifth Street | San Francisco, Calif. |
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SJOGREN MANUFACTURING COMPANY

# ARMSTRONG

## The first job more than pays for an ARMSTRONG Boring Tool

A single boring or inside threading job will often pay for an ARMSTRONG Boring Tool in setting-up time alone, for it is all tools in one. With a few cutter bits any mechanic can quickly grind from stock, shapes of high speed steel, and its 3 interchangeable Bar End Caps which hold cutters at 30°, 45° or 90°, it will do the work of a complete set of boring and inside threading tools.

"Tool changes" can be made without even removing the ARMSTRONG Boring Tool from the tool post. A half turn of a set screw permits the adjustment of the bar, permits the stiffest possible bar cut at every point. End caps are instantly interchangeable for changing of cutter or cutting angle, making possible the most convenient and efficient tool for each stage of the work.

End costly delays and increase machine output by equipping every lathe with an ARMSTRONG Boring Tool. They are instantly available from stock at your nearest supply house.

**ARMSTRONG BROS. TOOL CO.**

*"The Tool Holder People"*

**308 N. Francisco Ave. Chicago, U.S.A.**

**Eastern Warehouse and Sales:**
**199 Lafayette St., New York**

# MACHINE TOOL Blue Book

**Hitchcock Publishing Co., 508 So. Dearborn St., Chicago**

*34,000 THIS ISSUE* *JANUARY 1941* *VOLUME 36, No. 1*

CCA

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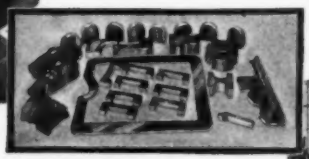
# DoAll STEPS UP PRODUCTION

At the Ingersoll Milling Machine Company, Rockford, Ill., discs for bearing retainers are made from 3140 flat steel on a DoAll in 30 minutes each. Outside diameter is 12", inside 9". A DoAll automatic circle cutting attachment is used.

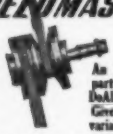
Other special parts made on the DoAll by Ingersoll include a target gauge in 15 minutes, 2 rocker arms in 12 minutes, head stops in 1 hour each.



## INDISPENSABLE IN DEFENSE WORK

The DoAll is the rugged machine tool that effects such sensational savings in time, labor and material. Takes the place of lathe work, milling and shaping in thousands of plants. Now used in 30 countries for cutting every kind of metal in automobile factories, arsenals, ship yards, aeroplane plants, machine shops, etc.

## SPEEDMASTER



An important part of every DoAll Machine. Gives instant variable speed.

A compact unit, also sold separately for use on any other machines requiring variable speed. Produces any speed 6 to 1 ratio, by mere touch of handle.

Let us send a factory trained man to your plant to show you what a DoAll can do and save for you.

FREE—Handbook on Contour Machining, 158 pages of valuable metal working helps.

**CONTINENTAL MACHINES, Inc.**
1300 S. Washington Av., Minneapolis, Minn.

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Does continuous filing, which means faster, better, smoother filing on all materials from toughest high-carbon steel to soft brass, wood, etc. Available are 12 styles of file bands, 3/8" and 1/4" wide—flat, oval or half round. Ask for circular.

PROFIT PRODUCING J&L MACHINE TOOLS

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—UNIVERSAL TURRET LATHES
—FAY AUTOMATIC LATHES
—AUTOMATIC THREAD GRINDERS
—COMPARATORS for Projection Inspection
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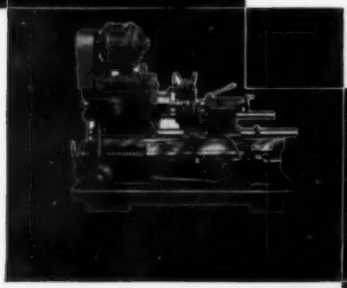

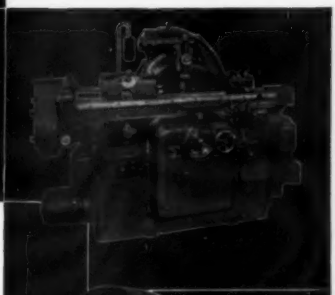

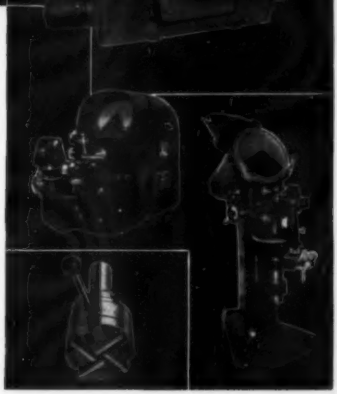

JONES & LAMSON
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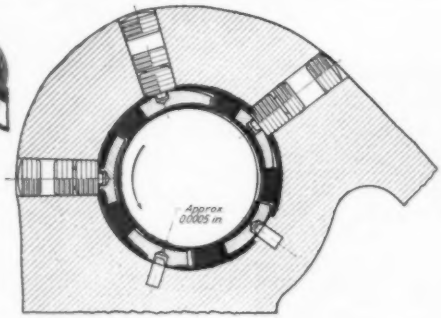
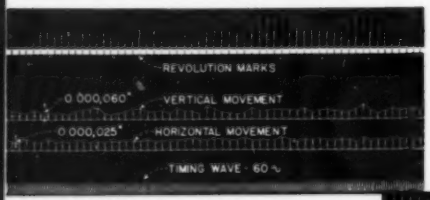
# You Don't Have to

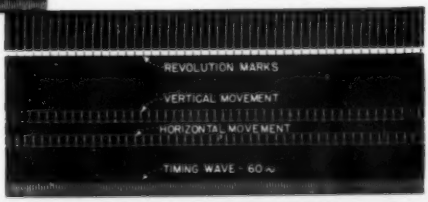
FILMATIC




**The FILMATIC principle. Self-adjusting shoes produce independent, converging oil films which develop high radial pressure, forcing spindle into central position. FILMATIC Bearing construction is fully protected by U. S. and Foreign Patents.**




**Left:** Old style bearing—60 millionths vertical flutter; 25 millionths horizontal flutter. Tips of wave peaks indicate spindle position once each revolution. Irregularity of wave tips shows slight fluttering of spindle axis.




**Right:** FILMATIC Bearing—no discernable spindle flutter. The even alignment of the wave tips in this oscillogram indicates a true running spindle.

**INCINNATI GRINDERS INCORPORATED**

CINCINNATI

# *Grow Up with the Machine*

## TO GRIND FINE FINISHES

IT takes a world of skill to grind fine precision finishes with many of the grinding machines in use today. The operator – or rather in this case, the craftsman – does his job well because he has lived with his machine for years, knows how it reacts to grinding oil or case hardened steel, aluminum, cast iron, in a multitude of sizes and shapes, he knows its every whim and fancy. Put him on another machine, and his quality factor goes way down. He's still as good a craftsman, but the machine is different, and it takes time to become acquainted.

Give your shop men CINCINNATI Grinding Machines equipped with FILMATIC bearings, and they'll consistently produce finer finishes at a more rapid production rate. **All** CINCINNATI Grinding Machines have FILMATIC bearings, and **all** FILMATIC bearings act alike. They do this for precision grinding:

Stop spindle "flutter"
Eliminate spindle bearing adjustment
Reduce maintenance
Improve grinding results.

Spindle flutter, a common source of chatter, is indicated on the two charts. The complete story is told in booklet G-446, entitled "FILMATIC". You may obtain a copy by writing to the address given below.

*Both Centerless and Center Type Grinders*

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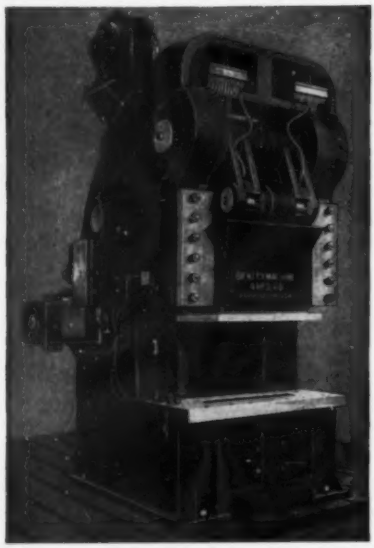

# No. 16 TOGGLE PUNCH PRESS

The No. 16 TOGGLE with large die space is suitable for punching and shearing tie plates, punching and straightening splice bars, also for general manufacturing press, punching and shearing articles. Drive is mounted inside of frame.

The Press is equipped with magnetic or air clutch. This is a high speed heavy duty Press for many applications.

## GENERAL DIMENSIONS:

| | No. 16 | No. 16A | No. 16B |
|---|---|---|---|
| Face of slide, right to left | 43' | 53' | 62' |
| Face of slide, front to back | 24' | 26' | 26' |
| Die space, slide down | 20' | 20' | 20' |
| Stroke; Standard | 3' | 3' | 3' |
| Maximum | 5' | 5' | 5' |
| Face of table, right to left | 53' | 60' | 66' |
| Face of table, front to back | 24' | 26' | 26' |
| Capacity | 700T | 850T | 1000T |
| Strokes | 40 | 35 | 30 |
| Depth of throat | 15½' | 15½' | 15½' |
| Weight | 76,000 | 82,000 | 88,000 lb. |
| Motor required Horse Power | 20 | 30 | 40 |

**BEATTY MACHINE & MANUFACTURING CO.**
**HAMMOND, INDIANA**

## ALSO BUILDERS OF

Punches: Single and Double—"C" Frame
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The CoPun Shear
(Cope Punch Shear)
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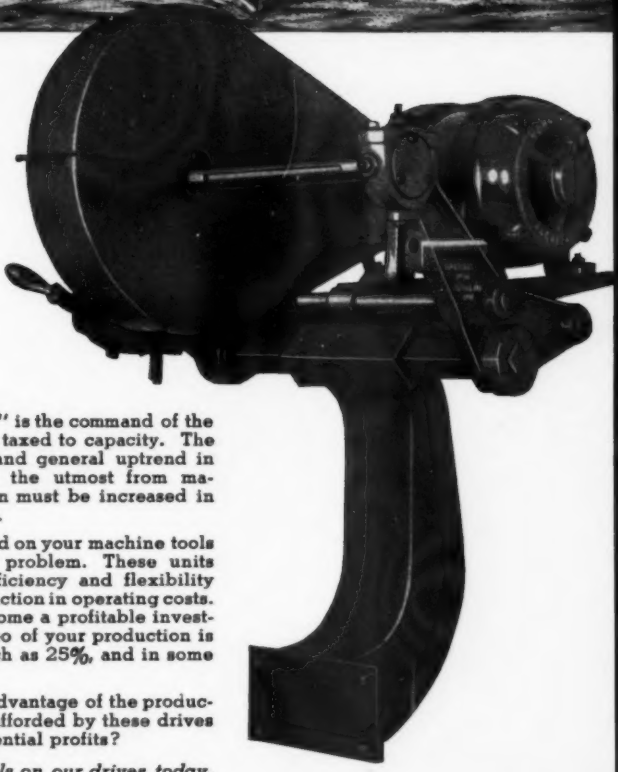
Hydraulic Presses.

# Full Speed Ahead with TORQ DRIVES



"Full Speed Ahead" is the command of the nation. Plants are taxed to capacity. The Defense Program and general uptrend in business, demand the utmost from machinery. Production must be increased in every possible way.

Torq Drives installed on your machine tools help to solve this problem. These units offer increased efficiency and flexibility with a marked reduction in operating costs. Your machines become a profitable investment and the tempo of your production is stepped up as much as 25%, and in some cases more.

Why not take full advantage of the production opportunities afforded by these drives and cash in on potential profits?

*Write for full details on our drives today.*

THE TORQ ELECTRIC MFG. COMPAN

6606 CARNEGIE AVENUE CLEVELAND, OH

# STOP PAYING HOMAGE TO OBSOLESCENCE

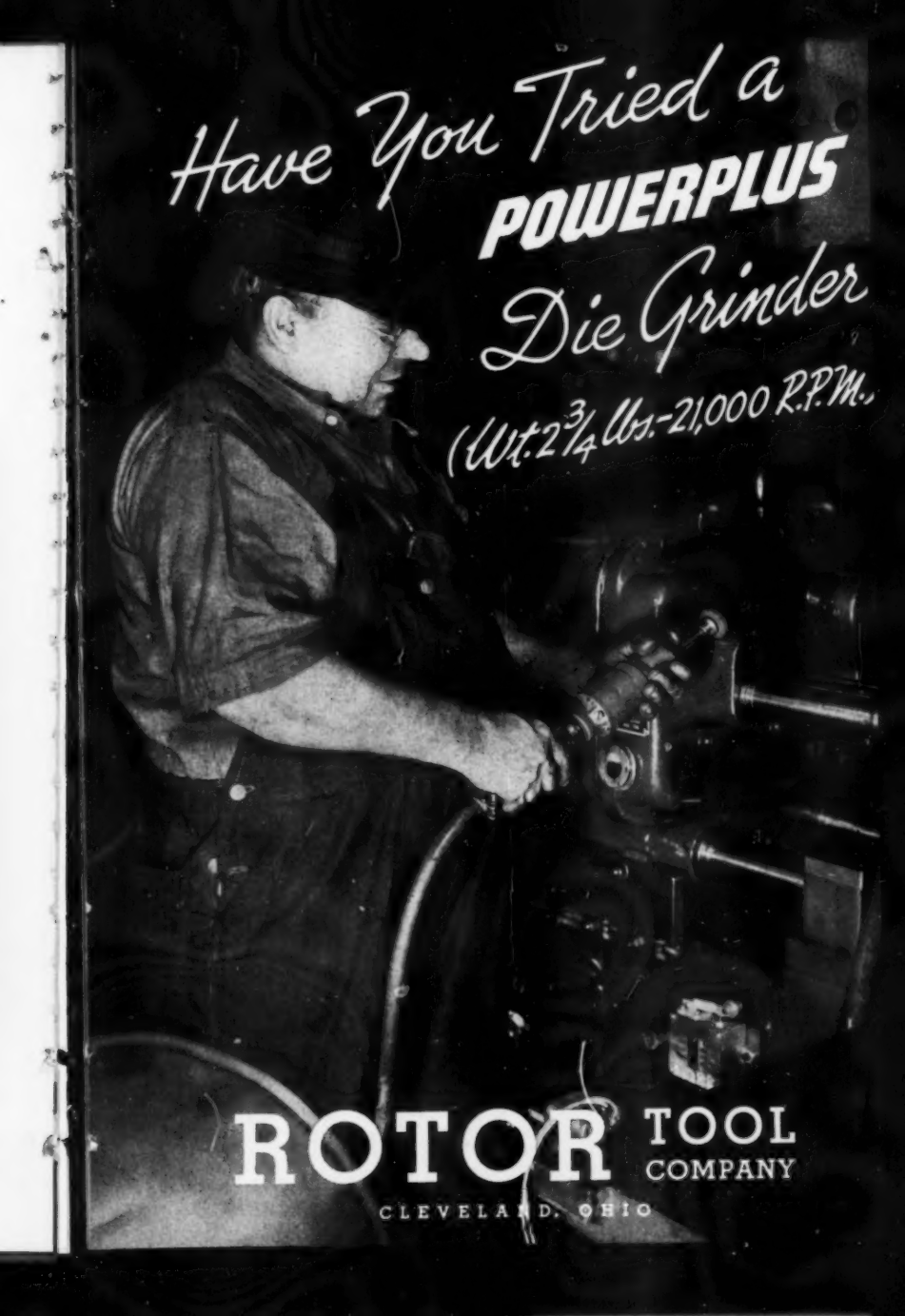
INSTALL Avey DRILLING and TAPPING MACHINES

The extra precision . . . extra quality . . . extra service built into AVEY machines are the very things to wipe out excessive obsolescence penalties along the production line . . . and to meet modern high speed production requirements. Compare AVEY features point for point for a full appreciation of what they mean in lower drilling and tapping costs. Write for illustrated and descriptive literature.

THE AVEY DRILLING MACHINE CO.
CINCINNATI, OHIO

1-Motor-Avey for intensive high speeds. 2-Motor-Avey Matic for regular production. 3-Avey Matic high duty drilling machine. belt driven. 4-Stand-ard belt drive No. 2 Avey Drilling Machine 5-Bench Type Motor-Avey for intensive speeds

1/16 TO .315 Avey
DRILLING MACHINES
BUILT TO DO THE JOB FASTER AND BETTER


Have You Tried a
POWERPLUS
Die Grinder
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ROTOR TOOL COMPANY
CLEVELAND, OHIO

# Fast Production Needs Correctly Ground Drills!

## Grind them on a Sellers Drill Grinder

More vital than ever before is the need for correctly ground drills—for it is only when drills are properly shaped and have the right clearances and angles of inclination that they can be operated at maximum speeds and feeds.

Sellers Drill Grinders provide a simple and efficient means of accurately producing correct drill points and of *duplicating these points* on any number of drills.

To keep in step with today's production demands, you need a Sellers Drill Grinder in your plant. They are used and recommended by all leading drill manufacturers.

Write for new illustrated catalogs describing Sellers Drill Grinders.

**William Sellers & Co., Incorporated**

1616 Hamilton Street Philadelphia, Pa.

FOUNDED SELLERS 1848

# Sellers

# 3 to 9 times faster Screw Driving!

**NEW THOR PIX-UP FINDER AND ADJUSTO-TRAY PICKS UP SCREW AND HOLDS IT FOR DRIVING**

**1. SORTS . . .**
Screws are tossed on slotted Adjusto-Tray. They drop into the slots with heads up, ready for instant pick up.

**2. PICKS UP . . .**
Screw driver is lowered to Adjusto-Tray, which depresses to thrust screw head into "Pix-Up" Finder. Grip is secure. Screw perfectly aligned.

**3. DRIVES! . . .**
The screw driver is brought to the work and the screw driven. One, two, three —the job's done! Assembly goes 3 to 9 times faster!

Though Thor portable power screw drivers have long been highly efficient at *driving* screws, the *hand operations* of picking up, starting, and guiding have always constituted a costly bottleneck in assembly operations. But no more! For the new Thor Pix-Up Finder and Adjusto-Tray, teamed up with Thor Power Screw Drivers, reduces screw driving to three quick steps, almost entirely *mechanical*. Now it's simply — sort . . . pick up . . . drive! And assembly goes 3 to 9 times faster! Any Thor portable power screw driver can be equipped with the new Thor Pix-Up Finder to drive any size or type of screw.

**For full information, mail coupon.**

**INDEPENDENT PNEUMATIC TOOL CO.**
**600 West Jackson Blvd., Chicago, Ill.**

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☐ Send information on new Thor "Pix-Up" Finder & Adjusto-Tray.

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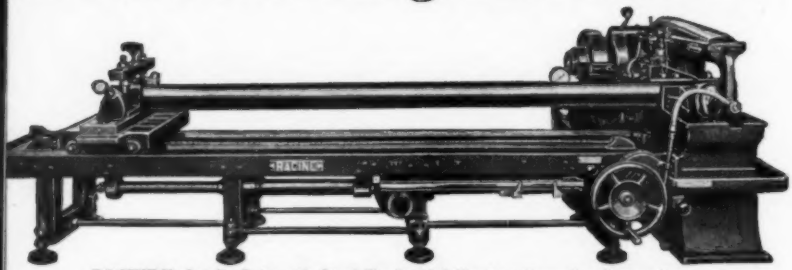
Company _____
Address _____
City _____

# RACINE

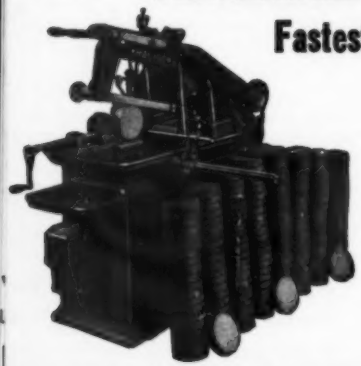
## *Metal Cutting Machines*



RACINE Hydraulic Automatic Stock Feed with full automatic cycle—Automatic hydraulic chucking—simple accurate control—May be applied to either the RACINE Oil Cut or the RACINE Hydraulic Heavy Duty Series.

## The RACINE Shear Cut—

### Fastest Cutting Production Saw



*RACINE Shear Cut—6x6 and 8x9 Capacity. With one blade 176 cuts, 5" Rd. Alloy Steel, each cut exactly 3½ min., and the blade still good.*

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This Shear Cut Model is one of a very complete line, including RACINE Heavy Duty Hydraulic Machines, RACINE Medium Duty Hydraulics and RACINE Utility Saws—6'x6'—to 14x20' Capacities.

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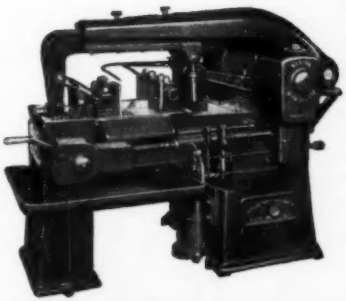
# RACINE

## Hydraulic



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3. Freedom from adjustments. Fewest moving parts.
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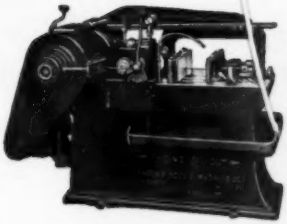
RACINE Heavy Duty Hydraulic Series. Fastest cutting for heavy bars, billets, die blocks. Single lever all front control. Capacities 10"x10" up to 14"x20". May be equipped with the RACINE Hydraulic Automatic Stock Feed.



RACINE Hydraulic Oil Cut—6"x6" capacity. A fast cutting, accurate, medium duty production saw. New in principle, modern in design. May be equipped with the RACINE Hydraulic Automatic Stock Feed.

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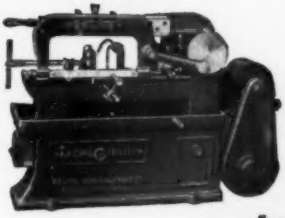

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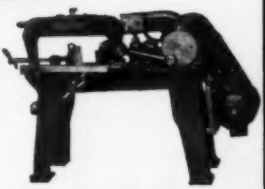

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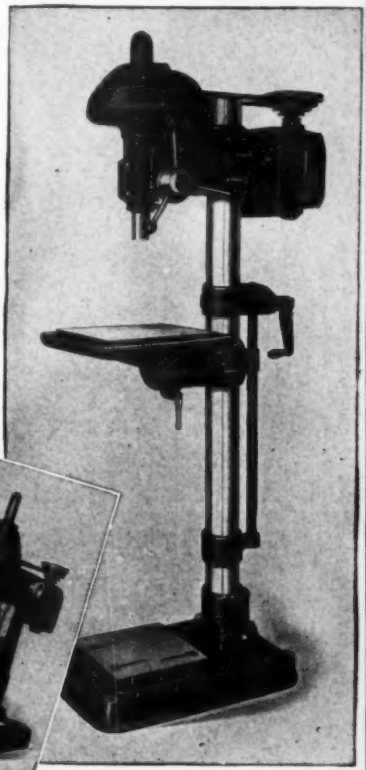

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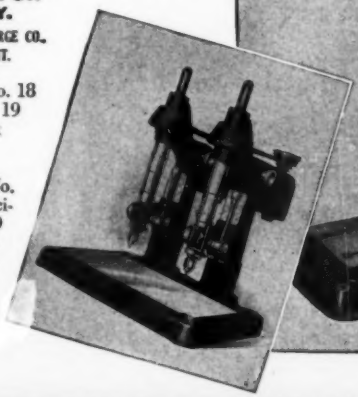

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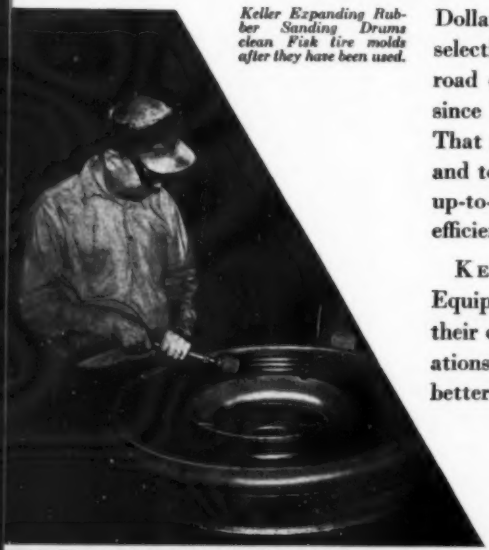

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BELOW: *The sleek lines of Fisk white-wall tires are enhanced by a final factory cleaning with Kellerflex Sanding Discs.* RIGHT: *At Fisk Keller Burs have changed mold finishing from a tedious hand filing job to an easy, power driven, accurate operation.*

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part played by KELLERFLEX in the smoothly rolling Fisk production lines has been duplicated in hundreds of other industries. They all agree on the low upkeep, speed, accuracy and efficiency of KELLERFLEX—*Headquarters for the finest of Flexible Shaft Equipment.* Write for complete information.

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Spindle tilts 180°, vertical movement 8", maximum clearance to column 32"

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## Berkeley Equipment Co.

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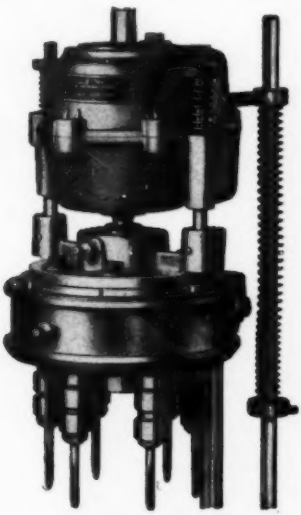

*A Typical Ettco-Emrick Multiple Tapping Head*

A complete tapping or drilling head tailored from **stock parts** to fit your specific job—that's the exclusive Ettco-Emrick system which enables you to tool up for multiple tapping or drilling in the shortest possible time and at low cost.

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Don't tie up a big shaper when so many jobs can be done just as accurately and much quicker on AMMCO 6" PRECISION SHAPER . . . Available for stationary installation or mounted on portable cabinet easily rolled to the mechanic's workbench.

Features of this Shaper include quick adjustment of stroke, ram position, tool head, table height, table support, feed and speed . . . The maximum length of stroke is 7¼" . . . Table has five cross feeds (reversible) . . . Countershaft has three-step cone pulley . . . ¼ or ⅓ H.P. Motor.

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## *AND ONE OPERATION TAPS THE HOLE AND SETS THE STUD*

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Here a MODERN Self-Opening Stud Setter, especially adapted for use on a Detroit Power Screwdriver is driving ¼" threaded studs into the untapped holes of die cast automobile radiator grilles. Yes this ¼" MODERN Self-Opening Stud Setter uses the stud as a self-tapping screw which threads the hole as it is being driven. Moreover, it does this twofold operation at the rate of one stud every one to two seconds.

Perhaps you too can put more into your product — can give your customers more for their money by letting MODERN Self-Opening Stud Setters lower your manufacturing costs.

If you are not now using MODERN Self-Opening Stud Setters or hesitate to use studs because of a doubt about setting them economically, tell us about your jobs. We have helped many others and welcome an opportunity of being of service to you.

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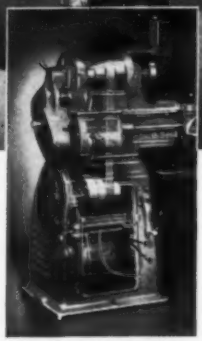


Phantom view of direct drive

SOUTH BEND LATHE WORKS

766 East Madison Street South Bend, Indiana, U. S. A.

# The Editor's Page

YEARS ago, when business machines were more of a novelty, I remember an employer who grudgingly consented to a demonstration test in his offices.

A bookkeeper who was handy with figures, was selected to pit his calculating speed against that of a new fangled adding machine.

At a signal, man and machine started figuring on duplicate jobs. Other office workers were vitally interested. Some, perhaps, feared their jobs were at stake.

At the end of a suitable interval, the boss called "time" and a checkup showed that through almost superhuman effort, manpower had won.

Instead of praising the nimble witted bookkeeper, the boss dryly remarked:—"Well Andy, see that you figure like that all the time!"

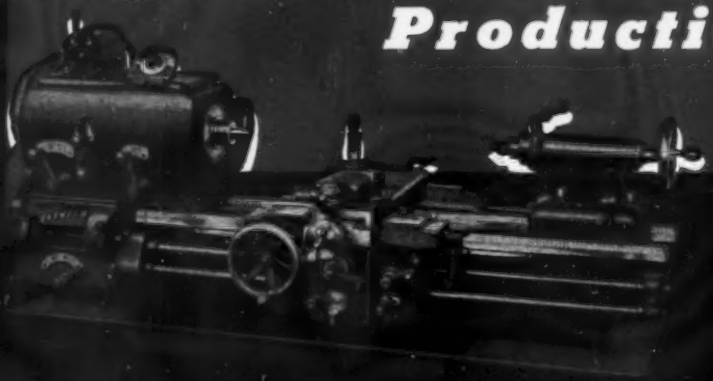
It's something like the present position of the machine tool builders, although Mr. Knudsen appreciates what they have accomplished.

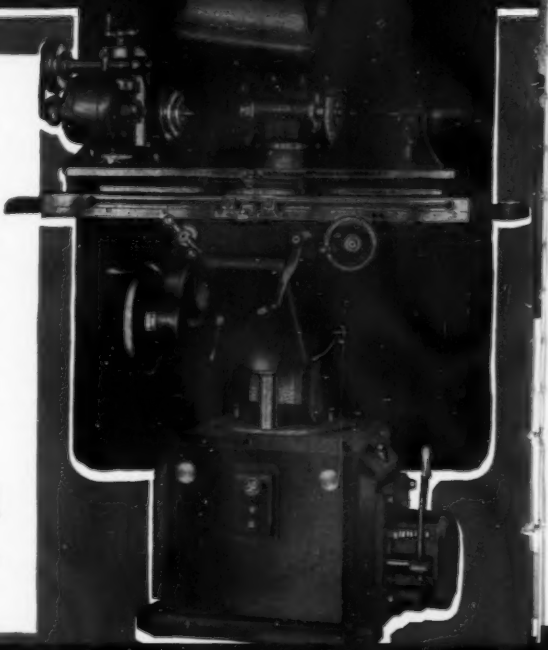
By prodigious effort, they have boosted machine tool production to about 300 per cent. And Washington says that further expansion will be necessary if all the defense requirements are to be fulfilled.

Just how it will be accomplished, perhaps the machine tool builders themselves cannot tell you at this time. But it's a foregone conclusion that if the Government insists it needs still more tools—it will get more tools and better tools—delivered on time. The American machine tool builders have developed the habit of doing the impossible, setting the pace for other industries participating in the defense program.

Wesley G. Paulson

# Designed for High-Speed Production





LeBlond Super Regal Lathes —sizes 13", 15", 17", 19", 21" and 24" — and the LeBlond No. 2 Cutter Grinder, are well known for their ability to speed up production, turn work with closer precision, and reduce production costs.

The R. K. LeBlond Machine Tool Co.

Cincinnati, Ohio, U. S. A.

# Featured In This Issue

**GRINDING CARBIDE TOOLS** — These new production aids are establishing many records in metal removal. For maximum results it is essential that carbide tools be serviced properly. In this authoritative article, R. A. Reed of the Norton Company gives many worthwhile hints and tips that will be helpful in tool maintenance.

**"FLOATING" THE DROP HAMMERS**—Vibration from a big battery of drop hammers was a serious problem in the Lockheed Plant—until a new system of isolated "floating" mounts was installed. David Hellyer tells how the job was done, what it accomplished and he gives some very interesting sidelights on hammer operation in the fast-moving aviation field.

**CARBIDE TOOL SHAPES**—This is the second in a series of articles by James R. Longwell, Chief Engineer, Carboloy Co. The first article appeared in the October Blue Book and covered the conversion of old machines for the use of carbides. The present installment deals with carbide tool shapes for steel cutting. Succeeding articles will deal with the use of coolants, design of tool and work holders and the design and grinding of chip breakers.

**VERSATILE HAND TOOLS**—Small in size but big in performance, these handy little auxiliary tools are saving time and dollars in a wide range of shop operations. Carleton Cleveland tells about many of these applications with hints and suggestions as to further uses.

**SUPPLEMENTARY FACTORY LIGHTING** — In the December issue, Dean M. Warren of the General Electric, Nela Park Engineering Division covered the broad aspects of general factory lighting. His current contribution is devoted to equipment which supplements general factory lighting, with recommendations for specific tasks.

**WELDING DESIGN** — This is the third and concluding section of an authoritative discussion of designing for welding—by R. A. Gast, M. E., of the Lincoln Electric Co., Cleveland. It is devoted to the mathematical or exact method of designing. Previous articles covered the approximate or direct replacement methods—and the conventional method.

**EXTRUSION PROCESS ARRIVES**—Abroad, extruded metal is playing an important part in defense. It is bound to assume an increasingly important part in our own defense measures. This article tells what is being done about it. The narrator is a British Engineer, Albert B. Cudebec.

**PSYCHOLOGY OF ENVIRONMENT**—Factory surroundings exert a powerful influence on the mental attitude and performance of the workers. Herman E. Henke of the American Electric Fusion Co., Chicago, tells his convictions along this line, which are borne out by actual observation and experience.

**MATERIALS HANDLING**—Bringing material into the plant, distributing it, and feeding it to the machines, handling the finished and semi-finished products — and by-products — all of these items figure largely in production costs. This story, and others to follow, by George A. Fairman will cover many phases of the handling problem.

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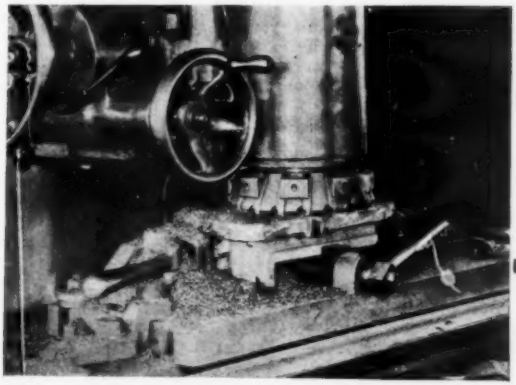
# Grinding Carbide Tools

By R. A. REED

THE recent substantial reductions in the prices of cemented carbide materials, coupled with the need for higher production rates to meet the demands of the defense program have brought a greatly increased interest in these super hard cutting tools. Naturally, this has resulted in a correspondingly increased interest in the proper methods of sharpening and reconditioning such tools. Many smaller concerns are using cemented carbides for the first time, and larger companies are finding that their increased use is requiring more careful attention to the maintenance question.

With any type of cutting tool, continued use after it has become dull causes increased pressure on the tip, with a resulting increase in power consumption and danger of tool breakage. Because cemented carbide tools are entirely different in composition and in physical properties from high speed steel and Stellite, it is even more essential that they be reground properly before they become dull to the point of failure. This difference in composition and properties also necessitates an entirely different technique to grind them successfully.

In producing the cemented carbides, powdered tungsten carbide is mixed with a binder or cementing agent, such as cobalt, and molded under high pressure into bars and other shapes and then sintered at very high temperatures in a hydrogen furnace. This sintering treatment cements the binder and the metallic carbide particles together, with a homogeneous structure of exceptional hardness but of low ten-



The imperative need for higher production rates is compelling increased interest in carbide tipped tools.

Grinding a cemented carbide tipped cutting tool with a green silicon carbide wheel.

sile strength and low heat conductivity—a combination that makes it impossible to grind the material successfully with the wheels used for ordinary cutting metals. Special wheels are necessary and the grinding wheel manufacturers have provided them. Today, three types of wheels are available for grinding the cemented carbides:—vitrified bonded silicon carbide wheels, resinoid bonded diamond wheels and metal bonded diamond wheels. Each has its field, but in general, it can be said that if a plant has any appreciable amount of cemented carbide grinding to do, one or the other of the diamond wheels will be found more economical in spite of a higher first cost.

Inasmuch as the use of silicon carbide wheels and resinoid bonded diamond wheels was covered in a general article on tool grinding published in the "Blue Book" last year (December, 1939) they will be reviewed only briefly here and this article will deal chiefly with the newer metal bonded diamond wheel — a development that has reduced drastically the cost of reconditioning single point cemented carbide tools.

## SILICON CARBIDE WHEELS

To avoid localized heating of any part of the carbide insert, with resultant checking or cracking, a soft grinding wheel is required. At the same time, the wheel must have sufficient strength or hardness to prevent its breaking down too rapidly. To meet these exacting conditions, a special silicon carbide abrasive has been developed which is extremely hard and sharp and thus suited to cutting the hard, dense cemented carbide material. Whereas the usual silicon carbide wheels are gray—almost black in color—the special silicon carbide has a distinctive green color. This color itself is an advantage, as it outlines the black cutting edge of the cemented carbide and enables the operator to see more clearly just what he is doing.

Both grade of hardness (bond strength) and structure (spacing of the abrasive grains) are very important in wheels for cemented carbide grinding and must be exactly right for the job. The type of cemented carbide, the type and condition of grinding machine, whether the grinding is being done wet or dry—all affect the selection of the wheel's grain, grade and structure.

### Offhand Grinding of Single Point Tools

Cemented carbide tipped lathe and planer tools may be ground offhand, either by first roughing on the periphery of a straight wheel and then finishing on the side of a cup wheel, or by both roughing and finishing on cup wheels.

When grinding offhand on the periphery of a small wheel, there is a tendency to under-cut or hollow grind the clearance. This is not objectionable in the roughing operation but rather desirable, as it reduces the area of contact between the wheel and the work for the finish grinding and thus minimizes the danger of overheating the tool.

### Grinding Wheel Recommendations*

Roughing:

| | | |
|---|---|---|
| Straight Wheel | 60-I7 or J7 | (Green Silicon |
| Cup Wheel | 60-I7 | (Carbide |

Finishing:
Cup Wheel 100-H7 or I7
120-H7 or I7
(Green Silicon
(Carbide

*Note: The grade designations used in this article are based on the system used by most grinding wheel manufacturers and in this, the grade letters increase in "hardness" from E to Z. Those used in wheels for cemented carbide grinding, namely H, I, J and K are all in the "soft" range. The numeral following the grade letter designates the structure of the wheel and "7" means a fairly open grain spacing.

These specifications are based on grinding dry. When grinding wet, wheels one grade harder in each case can be used to advantage.

### Machine Grinding of Single Point Tools

In semi-automatic tool grinders, the tool is clamped in a rigid fixture and fed to the grinding wheel by hand, by means of a screw feed. Too large feeds should be avoided, or localized heating may result and cause cracks in the carbide tip. For the same reason, the grade of the wheel should be selected with care. If the wheel is too hard to cut freely at the rate at which the feed is applied, excessive pressure will be built up on the tip, resulting in overheating and cracking.

Softer wheels, and in some cases, slower wheel speeds, therefore, should be used for tool grinders of the semi-automatic type employing cup wheels. It is also advisable to use a very small in-feed — no greater than 0.001" for each pass. The table traverse should be as fast as possible and the grinding done wet, particularly where a larger amount of stock is to be removed.

Another type of tool grinder uses straight wheels and features line contact grinding—obtained by oscillating the tool up and down in a straight line tangent to the periphery of the wheel. On machines of this type, the wheel should be of such thickness that practically the entire width of the face engages the tool. This avoids wasteful dressing of the wheel as a result of unavoidable grooving from the carbide tool.

### Grinding Wheel Recommendations

Roughing:
Cup Wheel 60-H7 or I7 Green Silicon Carbide

Finishing:
Cup Wheel 90-H7 Green Silicon Carbide

Roughing and Finishing:
Straight Wheel 80-J7 or K7 Green Silicon Carbide

### Milling Cutters

Cemented carbide tipped milling cutters, particularly in the larger sizes, are usually made with inserted teeth or blades so that in case of damage to any one blade, it can be removed and repaired without disturbing the others. After the usual backing off operation, using a cup wheel, the periphery, side and corner of each blade should be checked with a dial indicator to insure uniform blade height.

If an individual blade becomes damaged or badly worn, time may be saved and the life of the grinding wheel prolonged by removing the blade from the cutter head and grinding it off-hand to the approximate shape, after which it may be again inserted in the body, using a dial indicator to set it up accurately with relation to the other blades. A light finish-grind should suffice to insure that the assembled cutter head will run true and cut uniformly on each blade.

The corners of the blades should be somewhat rounded, either to a true radius, or to a 45° angle, supplemented by two angles of 22½° and 67½°, to avoid sharp points.

Solid tooth milling cutters are ground in the conventional manner, using the side of a cup wheel for grinding the clearance (backing off), on each tooth. Very light cuts should be taken and the same amount of stock removed from each tooth to insure maintaining the cutter round.

### Grinding Wheel Recommendations

Backing Off—
Cup Wheel:
Roughing 60-I7
Finishing 100-H7 or I7
(Green Silicon
(Carbide

**urface Grinding**

The same precautions should be ob-erved in surface grinding as were reviously outlined for fixture grind-ng on semi-automatic tool grinders, articularly with respect to the rate of own-feed, which should be very small -no greater than 0.001" for each pass. he table traverse should be as rapid s possible.

Surface grinding may be done either et or dry. Wet is preferable as it ermits the use of slightly harder rinding wheels and lessens the dan-er of overheating the tool. It is im-ortant that the work be flooded with ater as too little coolant is worse han none at all.

**rinding Wheel Recommendations**

Slow Table Speed (Dry)
Straight Wheel:
Roughing 60-I7
Finishing 100-H7
(Green Silicon
(Carbide

High Table Speed (Wet)
Straight Wheel:
Roughing 60-J7 or K7
Finishing 100-I7
(Green Silicon
(Carbide

**IAMOND WHEELS**

When cemented carbide cutting tools ere introduced and means of sharp-ning them became necessary, the rinding wheel manufacturers respond-d with special silicon carbide wheels s already described. These wheels re still being successfully used, but heels with a still harder abrasive were esirable and diamond wheels were eveloped—first the resinoid bonded heel and more recently the metal onded type which is proving so suc-essful on single point tools.

**ower Grinding Time and Costs**

While the first cost of the diamond heel is necessarily high, appreciable avings in time and ultimate grinding osts can be expected because of its ery fast cutting ability and extremely low rate of wear.

Additional savings in grinding time re possible with diamond wheels on multi-bladed tools, such as milling cutters, broaches and inserted tooth saws because of their ability to hold size. Amounts of material corresponding to comparatively large indexed feeds may be removed without significant wear. On tools of this class, the wear of silicon carbide wheels is such that each blade or tooth, after grinding, must be checked separately for size with an indicator. Diamond wheels permit progressive feeds to be applied to all inserts without leaving inaccuracies due to wear.

Grinding a cemented carbide boring tool for a Borematic with resinoid bonded diamond wheel.

Form tools and boring tools with irregular tip contours can be shaped readily and reground with diamond wheels because of their exceptional ability to maintain size and sharp corners.

**Less Danger of Checking**

The sharper, freer cutting action of the diamond abrasive eliminates the risk of checking or cracking the carbide tip, and so permits the produc-

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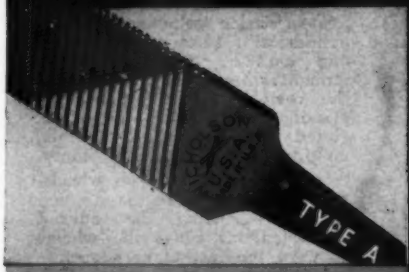


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tion and commercial finishing of new, harder or more sensitive grades of cemented carbides.

### Sharp Cutting Edge With Single Wheel

The necessity for lapping tools to a final keen edge with diamond powder or lapping compound is largely eliminated. Most tools can be reconditioned satisfactorily with a single diamond wheel. Under certain conditions, as for example, where an especially fine finish is being formed from the blank, it is common practice to employ either two diamond wheels of different grain sizes for roughing and finishing, or a silicon carbide wheel for roughing and a fine grit diamond wheel for finishing.

### Resinoid Bonded Diamond Wheels

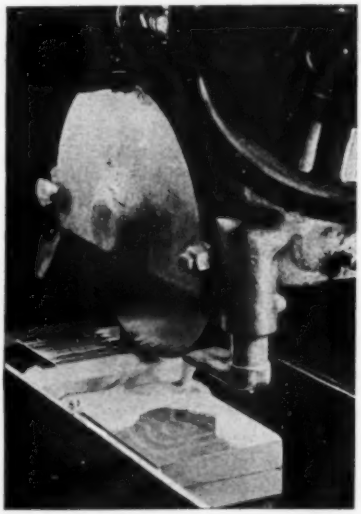
In this type of wheel, the carefully crushed and screened bort diamonds, as the commercial grade is designated, are bonded with a resinoid material and the mixture applied in the form of a layer to the composition core of the wheel. The thickness of the diamond layer and the concentration or percentage of diamond are varied in accordance with the job to be done. The three concentrations and their applications are as follows:

**Standard Concentration**—recommended for wheels used for fixed feed precision grinding, such as cylindrical, surfacing, internal and cutter grinding. Most straight wheels with diamond in the periphery come under this classification. It is also best suited for thin cut-off wheels, mounted wheels and hand hones.

In the peripheral type wheels, commonly used for fixed-feed precision grinding, the reduced concentrations cause the wheels to wear too fast to be economical and Standard Concentration, therefore, should ordinarily be used.

**50% Concentration**—recommended for cup or recessed wheels in the finer grit sizes, 220, 240, 320, 400 and 500 when used for constant pressure grinding. The term "constant pressure" is meant to include pressure between the wheel and the work supplied by hand or springs. The familiar Ex-Cell-O, Prosser and Sundstrand type cup wheels are in this classification.

**25% Concentration**—recommended for these same cup or recessed wheels in the relatively coarse grit sizes, 100, 120 and 150, when used for offhand grinding.



This surfacing of a group of cemented carbide tools in the plant of a prominent manufacturer is a typical job for a resinoid bonded diamond wheel.

Where an extremely fast cutting rate is particularly desirable, as in plants manufacturing cemented carbide tools in large quantities, and for most tool and cutter grinding operations, the resinoid bonded diamond wheel will be found most satisfactory. For recon-

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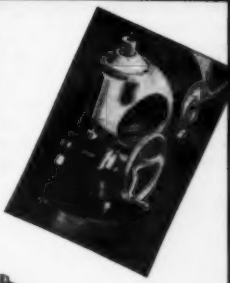

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ioning single point carbide tipped ls, however, the new metal bonded eel will be found decidedly more nomical because of its longer life.

### tal Bonded Diamond Wheels

The new metal bonded wheels com- e the hardest of all known abrasives, diamond with a metallic bond that extremely resistant to abrasion and at. The crushed screened diamond rasive is embedded in a rim of solid tal—a special alloy that holds the mond grains securely yet allows just ough wear to keep the wheel sharp. is metal rim is securely keyed to a lded plastic center or core. Thin cut- wheels are made entirely of metal t with the diamonds imbedded only the outer edge generally to a depth 1/16" or ⅛".

The principal field for the metal nded wheel is in cup shapes for off- nd sharpening single point tools, re- nditioning excessively dull or chipped gle point tools, grinding new illed and brazed" tools and grinding ip breakers; also in these types for tting sintered blanks to desired ngths, cutting rough semi-sintered nks to desired shapes and sizes and vaging chipped tools by cutting off the damaged portion of the carbide tip.

The advantages of the metal bonded diamond wheel are:

1. Long Wheel Life and Low Grinding Cost.

Extremely low rate of wear is undoubtedly the outstanding advantage of the metal bonded diamond wheel. Operators report having reground hundreds of tools without any measurable wheel wear.

Because of this resistance to wear, only 1/64" or 1/32" depth of diamond abrasive in the cutting surface is necessary. In fact, metal bonded cup wheels with 1/64" depth of diamond in the rim will outlast several resinoid bonded diamond wheels, with a correspondingly lower wheel cost per tool ground.

2. Practically Foolproof

By applying the tool to the metal bonded diamond wheel with a liberal amount of pressure, a fast cutting action is obtained, without any danger of injuring the diamond surface or the tool. Because of its harder and more heat-resistant bond, the wheel resists grooving and rounding of the corners to an exceptional degree. This quality makes it particularly suitable and eco-

Sharpening a single point cemented carbide tipped tool with a metal bonded diamond wheel.

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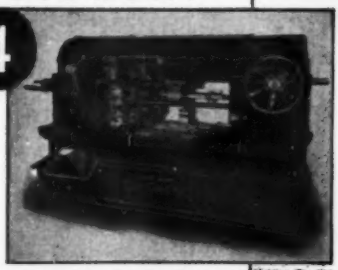
ECONOMY

4



ACCURACY

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PRODUCTION

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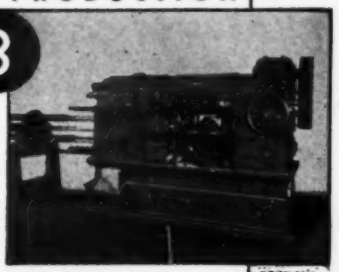

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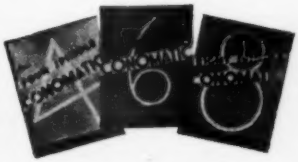

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nomical for grinding carbide-tipped tools presenting sharp or narrow contacts, that are destructive to the resinoid bonds employed in other types of molded diamond wheels.

3. Better Finish on Cutting Edge

A fine finish on the tool tip is desirable in order to prevent adhesion of the chips and cratering, particularly when machining aluminum and monel metal. The metal bonded diamond wheel, except immediately after dressing, will produce a smoother finish and, generally a keener cutting edge than that obtainable with a resinoid bonded diamond wheel of the same grit size.

With a 120 or 150 grit bonded wheel, for example, it is often possible to obtain about the same quality of cutting edge and surface finish as produced by a 220 grit resinoid diamond wheel. As a result, many plants are finding it possible to employ a single metal bonded diamond wheel or 120 grit size on tools that previously had been reground by means of separate roughing and finishing wheels of other types.

The resultant savings in time, when figured in dollars spent for direct labor plus overhead, in itself, more than pays for the initial cost of the metal bonded wheel.

Several standard grit sizes are available in metal bonded wheels and for off-hand grinding with cup wheels the following are recommended:

**Standard Grit Sizes**

Metal bonded diamond wheels are available in the following standard grit sizes. Unless otherwise indicated, they apply to cup shaped wheels and grinding by the off-hand method.

100—Rough grinding single point tools; also for cut - off wheels. As a rule, it should not be necessary to use metal bonded diamond wheels any coarser than 120 grit, even for roughing. This is particularly true of tools tipped with the hardest grades of cemented carbide.

120—Rough and finish grinding with one wheel. For reconditioning the general run of single point tools, 120 grit metal bonded wheels have been found to give uniformly best results. This grit size will produce a clean, sharp cutting edge, comparable, as a rule, to that obtained with a 220 resinoid type diamond wheel, and at the same time remove stock rapidly.

150—Rough and finish grinding with one wheel, with particular emphasis on high finish and keen cutting edge.

220—Fine finishing or lapping.

It is well to keep in mind that the finer the grit size, the slower the cutting action but the better the finish. Conversely, the coarser the grit size, the faster the cutting action but the rougher the finish .

**How to Use Metal Bonded Diamond Wheels**

Experience has indicated the following simple rules that must be observed to obtain the greatest value from the use of metal bonded diamond wheels on offhand grinding carbide-tipped single point tools:

1. Back off the steel shank on a vitrified wheel before grinding the carbide tip. While the steel is not injurious to the metal bonded diamond wheel, it will slow down the cutting action if it is of any appreciable area.

2. Apply the tool to the diamond wheel with **ample pressure**, at the same time moving it back and forth across the wheel face. This is very important. As a rule, there is no danger of grooving or otherwise injuring the diamond surface by employing an excessive amount of pressure. In fact, too light pressure should be avoided as this will cause the wheel to glaze and retard the cutting action. (The finer grit wheels, such as No. 220

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Mounting a straight diamond wheel and taking precautions to assure that it will run true.

and No. 240, will not withstand as severe grinding pressure as wheels of coarser grit sizes such as No. 120 and No. 150 and should be used with greater care.)

3. Dress the diamond surface with a silicon carbide stick if it should become glazed or loaded.

4. Use a coolant of either plain water or soda solution.

**lounting Cup Wheels**

Cup wheels are manufactured with ıe rim parallel to the back to insure ıe diamond surface being in running uth. Should the wheel "run out" on ıe spindle, due to the inner flange ing out of true, this can be corrected resurfacing the flange or, temrarily, by inserting shims between ıe flange and the back of the wheel.

**Vheel Speeds**

Metal bonded diamond wheels for ffhand grinding are recommended for peration at speeds between 4500 and 00 surface feet per minute. Howver, they have been operated at speeds low as 1600 surface feet per minte without any appreciable effect upon ther the cutting action or the wheel fe.

To obtain best results from cut-off wheels, they should not be operated above 3600 surface feet per minute.

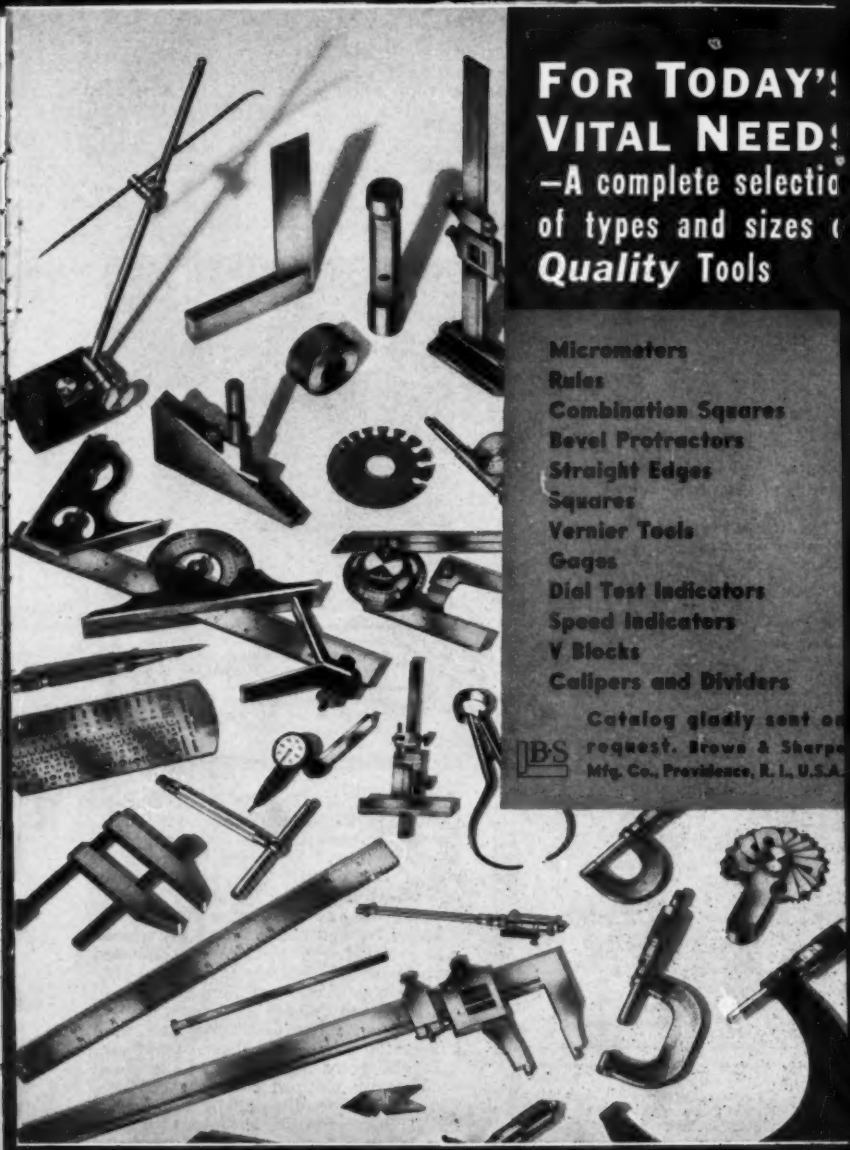
**Dressing and Truing**

Metal bonded diamond wheels, when used and lubricated properly, seldom require dressing. When allowed to run dry or to grind steel, they may become glazed and even loaded. Applying the tool to the wheel with continuous light pressure is also apt to glaze the diamond surface. This glaze can readily be removed by a silicon carbide dressing stick.

In the case of a cup wheel, dismounting it and rubbing by hand on a flat iron plate sprinkled with No. 80 grain silicon carbide abrasive will straighten the cutting face and at the same time restore its original sharpness. Care should be taken to keep the rim surface parallel to the back.

**Coolants**

As contrasted with the resinoid type of diamond wheel, which must be used wet to avoid excessive rate of wear, the metal bonded diamond wheel can be used dry without any injurious effect upon the bond or the life of the wheel. However, the use of a coolant of either plain water or soda solution is recommended, as it will serve to keep the work cool and the cutting face of the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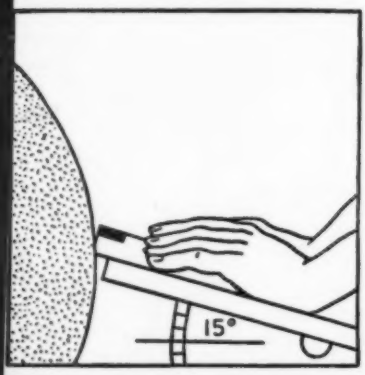
heel clean. Heavy oil lubricants ould be avoided as they tend to hear the diamond surface and retard e cutting action.

Metal bonded diamond cut-off wheels ust be used wet to insure straight ts and economical wheel life. The olant should be directed to both sides the wheel. If the machine is not quipped for wet grinding, a simple ut effective device for supplying a ntinuous flow of coolant to the heel may be made from a two-quart ntainer at the bottom of which is ttached a small pipe, with shut-off alve, leading into two ⅛" copper ubes. These tubes are pinched at the nds to provide a fine jet of coolant n either side of the wheel at the point f cutting.

The cut-off wheel also may be lu-ricated by means of a split felt wick aturated with a mixture of kerosene nd lard oil and supported so as to ipe against both sides of the wheel.

**acking-off the Steel Shank**

The steel shank of cemented car-ide single point tools should be backed




Backing-off the steel shank of a single point carbide tool preparatory to grinding the tip.

off to an angle of 10° or 15° on a sili-con carbide or aluminum oxide wheel before grinding the carbide tip on the diamond wheel. If the carbide tool grinder is equipped with a silicon carbide wheel for rough grinding, this wheel may be used for backing-off the shank by setting the tool rest table to a

Machine and fixture for cutting off cemented carbide inserts, using a metal bonded wheel. Attachment for lubricating both sides of wheel while cutting is not shown, but must be used.

sharper angle. The tip itself is then ground to the desired clearance angle. In the subsequent re-sharpenings of the tool, it will be found necessary to repeat the backing-off operation only occasionally.

**Cutting-off and Slotting**

Metal bonded diamond cut-off wheels will cut through sections of cemented carbide—either sintered or semi-sintered—in a fraction of time that is required with steel or copper discs charged with diamond dust, and with substantial savings in the cost per cut.

Single point tools that have been accidentally chipped can often be salvaged and reconditioned by cutting off the damaged portion of the tool with a metal bonded cut-off wheel and re-sharpening. The proper procedure is first to cut the steel shank up to the carbide tip with a regular abrasive cut-off wheel, and then complete the cut

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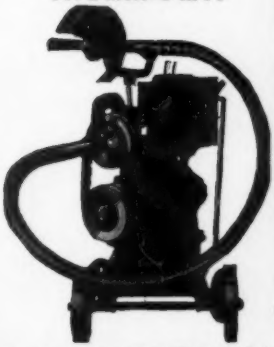

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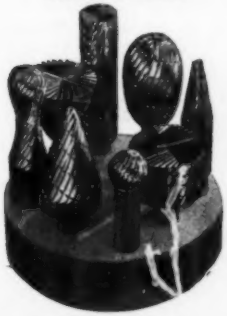

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hrough the carbide with the diamond heel, after which the newly formed utting edge is ground.

The diamond wheels most generally mployed in cutting off cemented car- ide blanks for tool tips are 3", 4", 5" nd 6" in diameter and from 0.030" to .040" in thickness, depending upon the iameter. For slotting or grooving urposes, wheels of any desired greater hickness may be had.

Cut-off wheels are generally made vith 1/16" or 1/8" depth of diamond in he periphery. The grit size most com- nonly used is No. 100. The metal cen- er of all, except the 0.020" thick wheels, s relieved a few thousandths of an nch on each side to prevent binding n the cut.

It is important that the wheels be nounted between flanges of as large iameter as the work will allow, to nsure maximum rigidity and straight- ness of cut. Furthermore, the wheels hould be used only on constant pres- ure types of cut-off machines, or, in other words, machines on which the pressure between the wheel and the work is supplied by means of a weight or spring. The amount of pressure hould be only enough to allow the wheel to cut its way through the car- bide freely. The cut should never be forced, as otherwise the wheel, which s relatively fragile, might break.

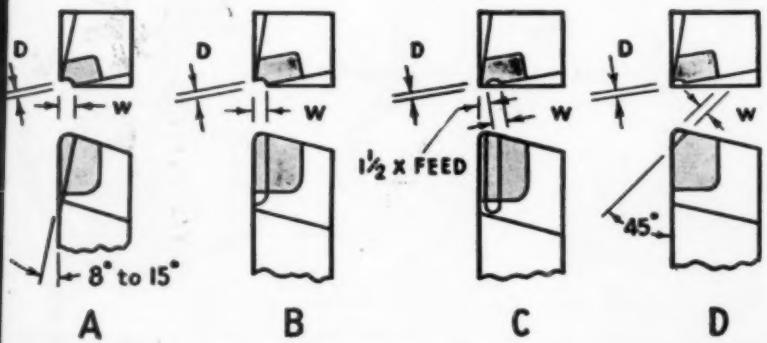
For best results, metal bonded cut-off wheels should not be operated in excess of 3600 surface feet per minute. Furthermore, they **must** be used wet, with the coolant directed to **both** sides of the wheel.

**Chip Breakers**

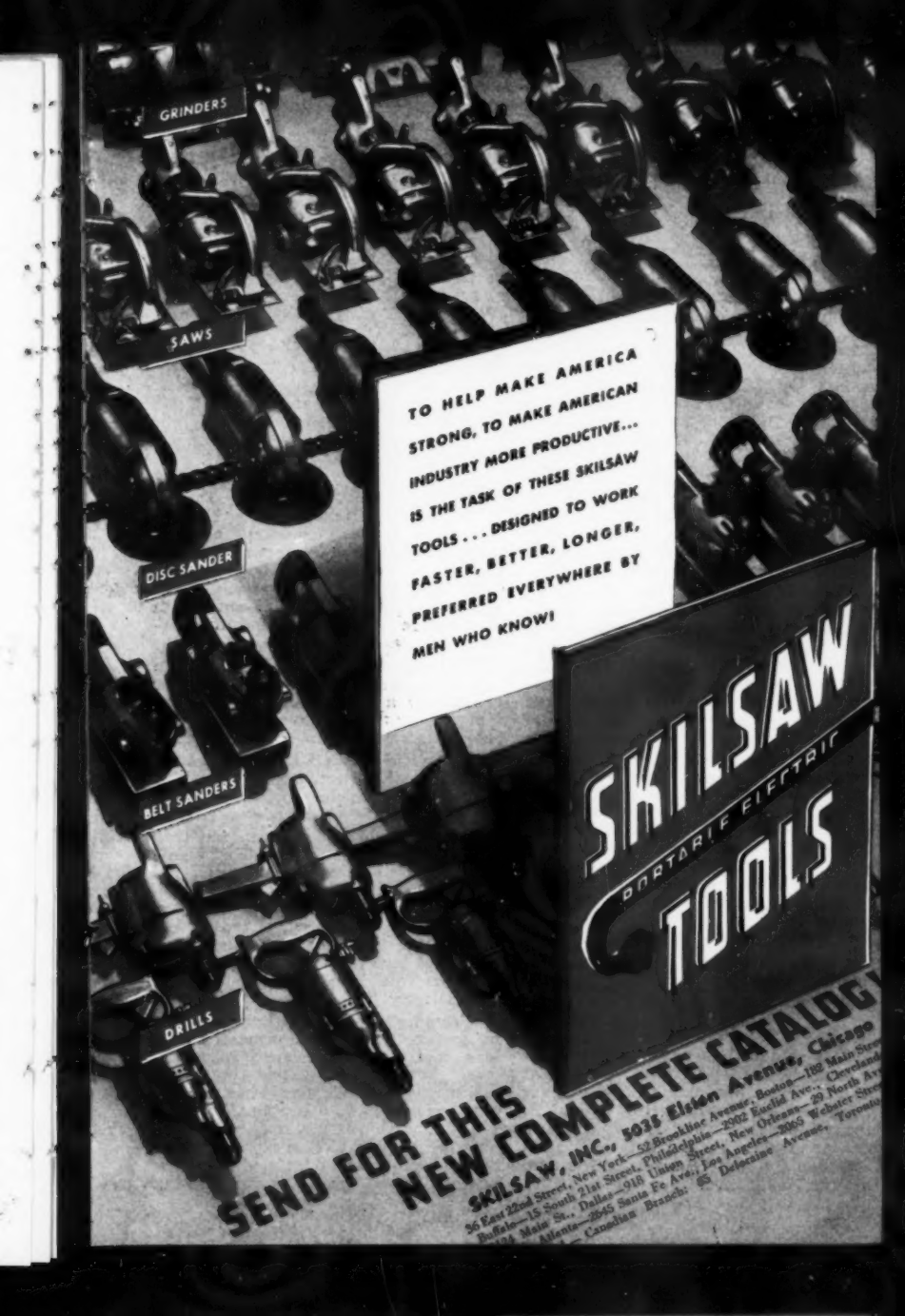
When machining steel at high speeds with tools of the usual shapes, continuous chips are produced. These chips are not only hazardous to the operator, but also difficult to handle.

Continuous chips can be controlled either by grinding a chip breaker or curler groove in the face of the tool, or by employing a mechanical chip breaker mounted above the tool tip. The chip breaker groove is usually preferred and, with proper grinding equipment, can be ground in the face of the tool tip quickly and accurately. Four designs of the ground-in chip breaker most commonly used are shown in the accompanying figure.

The chip breaker shown at (A) is generally preferred because the chip is deflected back against the unturned shoulder of the work where it is broken without any damage to the tool. By varying the depth and width of the groove, this style of breaker can be adapted to practically any set of conditions.




Four designs of ground-in chip breakers that are commonly used.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The parallel type of chip breaker shown at (B) has a tendency to throw the chip ahead of the cut and over the side of the tool. It is somewhat objectionable in that the chips cause more or less wear on the side of the tool.

The so-called engraved style of chip breaker, which resembles a high speed steel tool that has been allowed to wear its own chip breaker, is illustrated at (C). This design has been successfully applied where the cutting speeds are relatively low. As illustrated, the land between the cutting edge and the groove should be approximately one and one-half times the feed.

For light, fast finishing cuts, a chip breaker ground at a 45° angle, as shown at (D), is best. This type of breaker forces the light chip either into a spiral curl or a small ball which can be handled very easily.

The ease with which the chip can be broken depends upon the chip cross-section and the physical characteristics of the material being cut. A thin, springy chip is impossible to break, but can be coiled, whereas a thicker chip with some stiffness usually can be broken. Whether a chip can be stressed to the point of breaking, for a given speed, feed, depth of cut and material, will depend upon the depth and width of the breaker, or D and W respectively on each sketch. It is also possible to stress a chip to the breaking point, when using a tool with a given depth and width of chip breaker, by varying the speed or feed in order to obtain a chip of sufficiently stiff cross-section.

The following recommendations for depth and width of breaker will be found satisfactory for most applications.

**Depth of Chip Breaker**

This should be approximately two-thirds the feed and never less than 1/64″. The depth should be sufficient to force the chips to deflect or curl in the proper direction. If the depth is not great enough, the chip will slide over the top and thus render the chip breaker ineffective.

**Width of Chip Breaker**

The width of the breaker determines the diameter of the curled chip. The narrower the groove, the more the chip will be choked, which means a smaller diameter of curled chip. The width of the chip breaker for styles (A) and (B) in the previous figure is, as a rule, approximately one-half the depth of the cut. The width of the groove for the "engraved" style of breaker varies from $\frac{1}{16}$″ to $\frac{1}{8}$″ depending upon the surface feet per minute and the material being machined. For the 45° angle breaker shown at (D), the width generally varies with the application; usually it does not exceed 3/32″.

**Grinding the Chip Breaker**

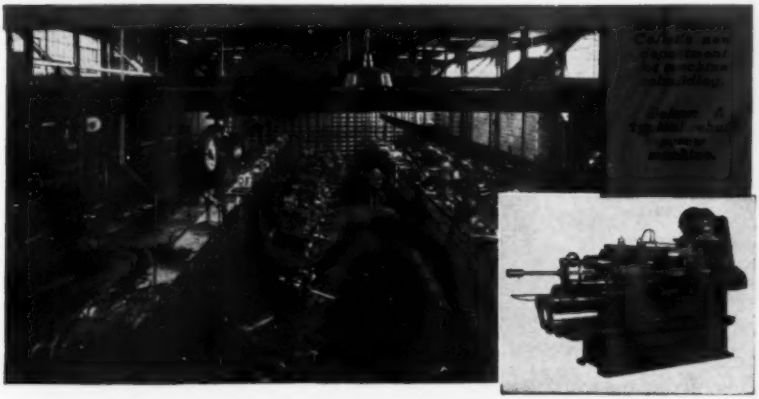
It is essential that the chip breaker be ground to the same shape and dimensions each time if proper chip control is to be maintained. This requirement precludes the possibility of grinding chip breakers offhand with any degree of accuracy and duplication.

The recommended procedure is to use either a universal tool and cutter grinder or a small reciprocating surface grinder that may already be available, or a special chip breaker grinder.

The tool is clamped in a tool holder, preferably of the universal type, which is then positioned to provide the shape and width of the chip curler desired.

On all of these machines, the chip breaker is ground with a resinoid bonded type of diamond wheel, usually 4″ to 6″ in diameter, $\frac{1}{8}$″ or $\frac{1}{4}$″ thick, and with one edge slightly rounded. The grit size of the wheel most commonly used is 100 or 120. The vertical wheel feed must not exceed 0.0005″ per pass while the table speed should be relatively high.

Where a chip breaker fixture is used in conjunction with a cemented carbide tool grinder designed to mount cup type diamond wheels, the metal bonded type of diamond wheel is recommended. It is exceptionally suited to grinding chip breakers because of its extremely low rate of wear and resistance to grooving and rounding of the corners. The same metal bonded



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Touching up a carbide tipped single point tool with a diamond hand hone.

wheel that is used for resharpening the tool, usually 120 grit, may be used for grinding the chip breaker. The outer edge of the wheel is generally rounded to about 1/32" radius.

**Hints on Single Point Tools**

1. Use only the special wheels recommended by the grinding wheel manufacturer, or the manufacturer of the cemented carbide tools.

2. Regrind before extreme dullness is reached — for example 90% of the maximum number of parts per grind. By following this practice, it is necessary to grind off only a very small amount of the carbide tip on each grind, thereby prolonging the tool life.

3. Touch up the tip with a diamond hand hone occasionally between grinds to maintain a keen cutting edge and to conserve the life of the tool.

4. Never hold the tool stationary against the grinding wheel because excessive localized heat will be generated and expansion of the carbide tip may occur, resulting in cracks or checks. Instead, the tool should be oscillated or rocked as long as any part of the tip is in contact with the wheel.

5. Diamond wheels should be used wet. Use a generous supply of water or soda solution to keep the tool cool. Remember that a **little** coolant is worse than none at all.

6. Never quench the carbide tip in water to cool it after grinding. This is likely to crack the material and render it unfit for further use. If air cooling is not rapid enough, immerse the **steel shank** in water, but **not** the tip.

7. To avoid chipping, always grind **against** the cutting edge, that is, from tip to shank.

8. In resharpening, maintain proper rake and clearance angles as recommended by the tool manufacturer. Simple sheet metal templates are helpful when grinding offhand.

9. Keep the grinder spindle bearings snug. A vibrating or out-of-true wheel will not produce keen edges and may crack the carbide tip. Support the tool on a work rest table of ample size and adjustable to any desired angle.

10. It is desirable to appoint and train one man or a special crew to grind all the cemented carbide tools in your plant. No uninstructed operator should be allowed to grind these tools.

If each plant using cemented carbide tools will carefully study and classify their sharpening jobs and then use whichever wheel—silicon carbide, resinoid bonded diamond, metal bonded diamond—or combination of them is required it will be found that cemented carbide cutting tools can be ground both efficiently and economically

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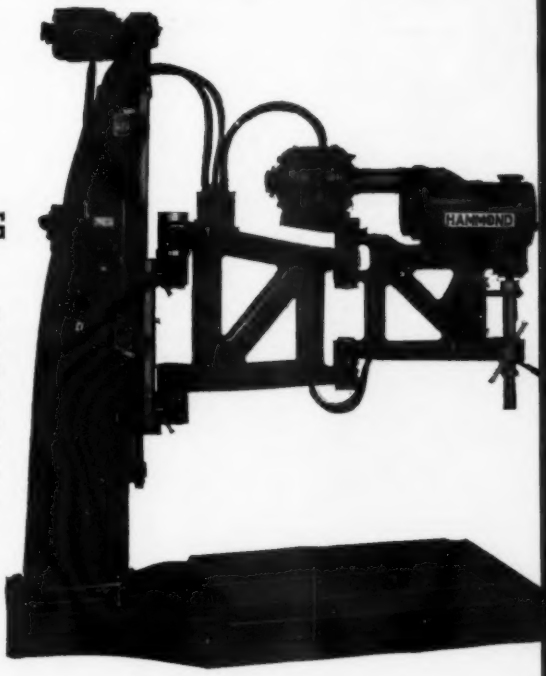


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# "Floating" the Drop Hammers

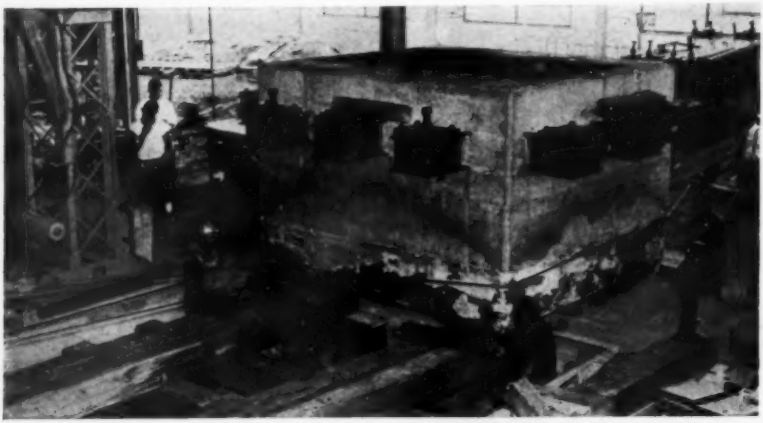
By DAVID HELLYER

LONG plagued by troublesome vibration caused by their plant's drop hammers, engineers of Lockheed Aircraft Corp., recently determined it was time to rid their factory of the nuisance. This decision was strengthened by the fact that, keeping pace with plant-wide expansions designed to produce aircraft for national defense at maximum efficiency, Lockheed's battery of hammers increased from four in May, 1940, to 11 in November. (As of July 1, the company's backlog totalled $169,845,414, and has increased in the interim.)

Today, in a building especially erected to house the giants, Lockheed has located its battery of metal-moulding moguls—said to be the largest battery (numerically) of hammers thus isolated to be found in any factory in the nation, regardless of industry. And each of the giant machines is individually isolated.

The solution of Lockheed's problem was "floating power," involving the use of principles similar to those employed by automotive manufacturers in mounting automobile engines on shock-absorbing mountings.

Of Lockheed's 11-hammer battery, 10 of the stampers are rope-operated, of the company's own design. "Big boy" of the lot is the Chambersburg pneumatic Cecostamp, which rests on a man-sized concrete block tipping the scales at 75 tons. Each hammer is installed in its own pit, independent and separate from adjacent pits, so that any possible settling of any one unit will not disturb others. Each hammer is bolted down solidly on a concrete inertia block, which is in turn mounted on huge springs that take up the initial



Moving a 75-ton block to the new drop hammer building. The Cecostamp unit was moved separately and installed on it. Spring shock absorbers are mounted on the sides of the block.

shock, conveying the impact from hammer to foundations, where it then disperses into the ground. Or, to put it more technically, the dynamic force of the falling weights is absorbed by the deflection of the spring units, with deflection under maximum conditions of slightly over ⅝".

While mounting the 10 rope-operated stampers in their new beds could certainly not be classified as easy, installation was relatively simple when compared with the operations in moving the Cecostamp from its original bed to its new shock-proof quarters. A crew of 10 men, using two crane trucks, a low-bed heavy duty semi-trailer truck, a number of Roebling cables and many 12" x 12" timbers, performed the job. The 75-ton inertia block was lifted laboriously from its old pit and let down into the new bed by 10 Simplex step-jacks, of 20 tons capacity each.

A gargantuan operation, the moving and reinstallation of the hammers has proven outstandingly successful, for today one may place a glass of water on the floor 10 feet away from the great Cecostamp as it whacks its way into a piece of dural, and the surface of the water scarcely shimmers!

These stampers, vitally important units in nearly all aircraft factories today, are remarkably versatile instruments when operated by skilled men. There is scarcely a phase of sheet metal manipulation which cannot be performed with a well-manned hammer. As one aircraft man recently put it:—"The function of these stampers is to take a stubborn sheet of metal that doesn't want to be a certain shape, and make it change its mind, quickly."

While the method is far from "new," still more and more industries are turning to drop hammering for solutions to production problems. Keeping pace with development of better stampers, metallurgists are constantly developing special steels and other materials best suited for moulding in the hammers.

With the evolution of all-metal airplanes came the development of new techniques in hammer operation. Today, designing engineers take these machines into consideration when laying out their plans, so that as many small parts as possible may be eliminated by combining into one detail, many of the separate details normally found in riveted aircraft construction. Savings in time, and production costs,

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have made drop hammers virtual necessities in efficient production of modern aircraft.

There is far more artistry required in operating one of these moguls than would appear on the surface. Operators must understand intimately the materials with which they are working. Sheet metal is, to a certain extent, pliable and able to stand some beating and stretching. But it will become brittle, and crack when over-beaten. The hammer worker must be familiar with the characteristics of his medium, and work with it accordingly.

For example, in the case of aluminum alloys, most of which are Alclad or Dural sheets coated with a thin layer of pure aluminum, the material can be worked as received, in annealed condition. After being worked in the hammers, it becomes toughened and must be annealed again, and so is dipped in a pot of molten lead, or given a heat treatment, to bring the material to a uniform hardness

A pile of the husky steel springs used in the hammer mountings.

throughout, and remove variations in toughness which might allow breaks to develop.

In aviation production, parts formed by drop hammer technique may be divided into two major classifications:

(1) Parts which follow the outer surface of the airplane; and

(2) Parts which are to be used in internal structure, such as housing, ducts, installation guards, covers, etc.

Lowering a drop hammer into place on its concrete block isolation.

In the case of (1), basic forms for parts of this type can usually be obtained from detail drawings, or directly from loft layouts. Master forms are then developed in either wood or plaster. For (2), it is customary to produce master forms directly from drawing dimensions, just as in the case of castings, forgings, etc.

Following design of a drop hammer part, a number of operations are involved before finished parts may be produced. In connection with production of parts which follow the outer contour of an airplane, Lockheed has found it generally feasible first to make a master form, as for example a form equivalent in shape to an entire nacelle. Full-size templates representing cross-sections of the outer contour of the structure are obtained from the loft. (Templates thus used are of major or vital cross-sections only.) These templates are placed in their proper arrangement, as they would appear in the structure, and spaces between them are filled with plaster. Spacing is suf-

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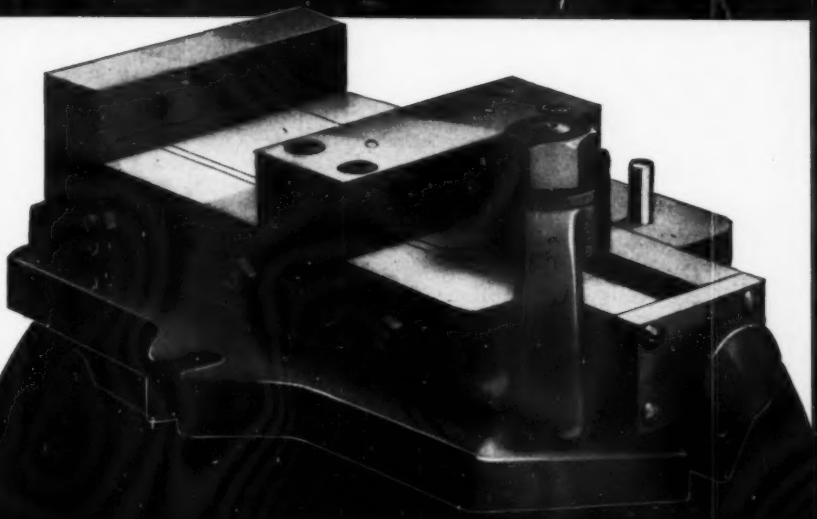

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ficiently close so that a safely-defined surface is assured. The resultant basic form is shaped to the exact form indicated by the outer contours of the templates. This method is comparatively simple and rapid, and also inexpensive, as working with plaster offers no particular difficulties.

Where a master form is developed, all component forms may be produced directly from this shape. The use of plaster insures perfect curvature of the master, as any unevenness or deviation from true contours may be detected readily. Thus, all component forms taken from the master model will fit perfectly and have a satisfactory appearance.

## Die Molding

From this point, the making of various positive and negative plaster casts and molds progresses, from which ultimately emerges a sand mold, into which the die alloy is poured. Kirksite, used almost exclusively at Lockheed for die casts, is poured at a temperature of approximately 800 degrees F. The die is then taken from the sand mold and carefully finished to exact specified dimensions, as the accuracy of finished parts will depend entirely on the accuracy of the dies. (However, work on drop hammers is not classified as a precision operation. Dies have a tendency to spread with use, causing finished parts to "grow." Therefore, plus or minus 1/32" is generally allowed for tolerance on average small parts.)

A positive counterpart of this die is the lead punch, with which it is used. This lead punch is produced by pouring molten lead directly into its companion piece, the zinc or Kirksite die, and several steel bolts are incorporated in the lead for anchoring the punch in the drop hammer "head." As the molten lead would develop severe folds and wrinkles if poured into a cold die, the die is pre-heated to approximately 300 to 400 degrees F, thus permitting the lead to flow freely. Lead has no tendency to stick to the die material, and, after cooling, the punch is withdrawn, and is ready for use after from 12 to 24 hours cooling. (The life of a lead punch is approximately one-third to one-fifth that of a zinc or Kirksite die.)

The punch and die are now ready for the drop hammer. The die is fastened directly to the hammer bed by clamps, or by casting a lead frame around the base. The lead punch is fastened into the upper movable part of the drop hammer, designated as the "head."

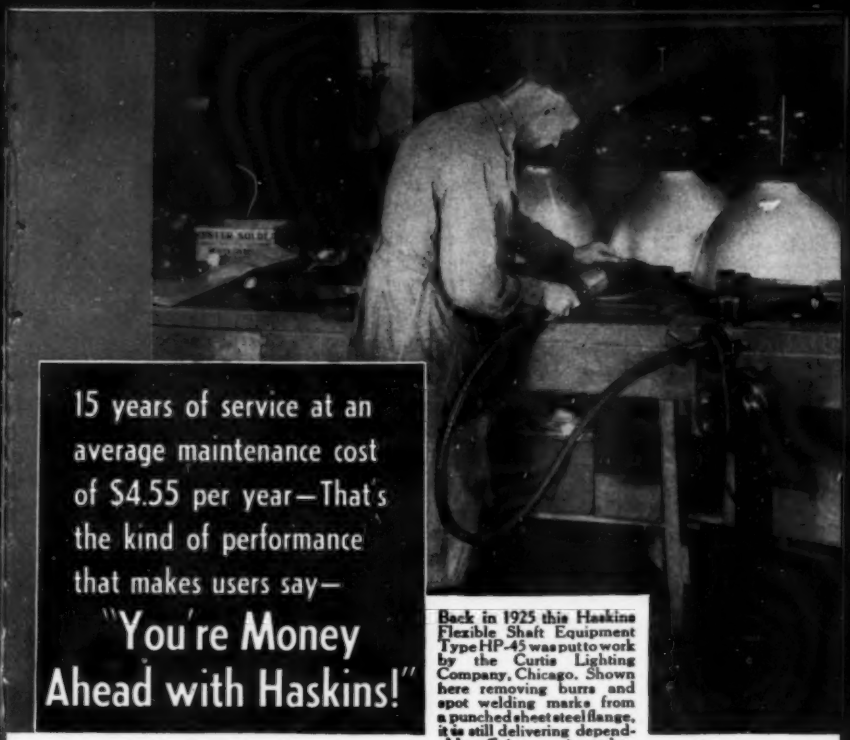
The rest is up to the operator, who has full control of the action of the punch. He may cause it to be dropped directly, with full weight, on the die, or with a light impact if desired. Blows can be repeated as fast as 50 per minute if necessary.

## Progressive Dies

To facilitate the flow of sheet metal while in the hammer, it is common practice to employ some lubricant such as vegetable oils or special drawing compounds. If the desired form is such that there exists a possibility of the metal tearing or developing folds, rubber blocks may be used to assist in preforming, and gradual working of the material may be necessary. Quite often a series of progressive dies is used as a means of controlling forming, especially when severe draws are required. Progressive dies are, of course, modifications of the final die which impart some portion of the final shape to the sheet metal before it is struck into finished shape. These dies are not particularly expensive, due to the fact that no particular exactness of dimension or contour is necessary. (Approximately three of these dies may be made for the cost of one final die.) A further advantage in using progressive dies lies in the fact that they prolong the life of the expensive final die.

Very often, parts formed in the drop hammers require additional finishing, especially along edges of flanges or in areas where drawing occurs. These areas are straightened by reworking with a hand or speed hammer. This "retouching" process is simple and inexpensive.

As compared with hydro-press production, drop hammer parts are not



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formed from blanks of the exact required size. Instead, oversized blanks are used, and the finished parts trimmed after forming, either by hand, on a pin router, shaper, or other tool.

Weight of punch and die sets employed to date by Lockheed have ranged from 654 lbs. to 7300 lbs. Bed sizes of drop hammers range as follows:

(a) small hammer, 1 ton: 26″ wide, 38″ long;

(b) large hammer, 3 ton: 48″ wide, 60″ long;

(c) large hammer, 4 ton: ditto;

(d) Cecostamp hammer: ditto.

## Performance

A wide range of dimensions may be handled on the drop hammers. Parts may vary from small brackets up to large units covering the whole drop hammer bed. The maximum size bed on the largest hammer is approximately 3½ feet by 4 feet. Aluminum and aluminum alloys of all types may be formed on the drop hammer, although only the most economical alloys for production are in general use. Stainless steel and similar metals may be formed if in annealed condition, though steel punches and dies are often required for harder metals.

The most practical gauge of aluminum alloys for drop hammer forming is .051″. Thicknesses under .025″ cannot be formed satisfactorily because of their tendency to wrinkle excessively. Thicknesses greater than .064″ have a tendency to work-harden rapidly. In stainless steels, gauges from .008″ to .049″ may be handled efficiently.

So, day in and day out, tirelessly and efficiently, these drop hammers perform alongside hydro - presses, punch presses, and a hundred-and-one other smooth-running machines in producing their share of the nation's multi-billion dollar defense aircraft. And, years hence, when (it is hoped) the world is once again at peace, and the nation's defense needs have been fulfilled, these machines will continue to produce for the demands of peacetime aviation.

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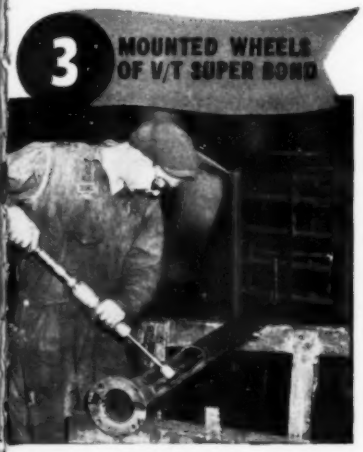


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Send for either DeLuxe model HANDEE or the Hi-Power and try it for 10 days in your own plant.

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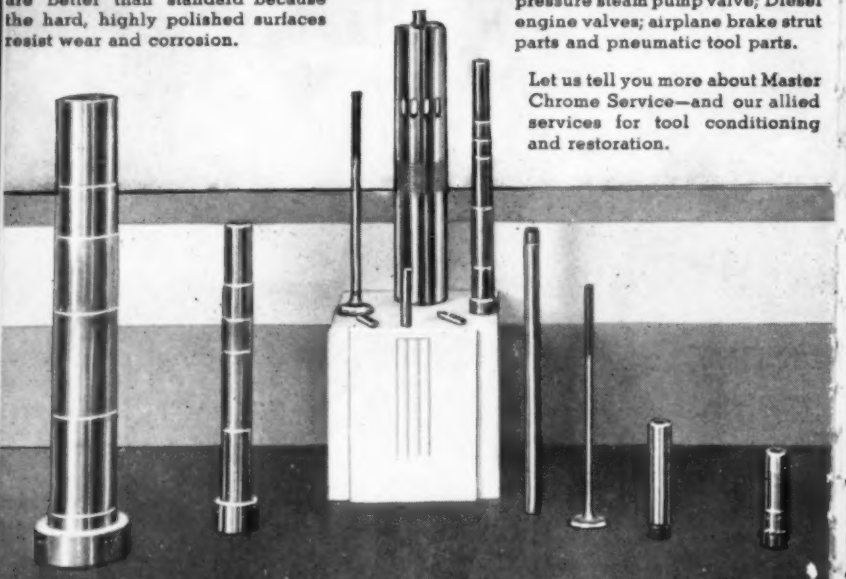
Time and labor may be lost—delivery dates missed, when important parts have to be scrapped because they're undersized.

More than that, chrome plated parts are better than standard because the hard, highly polished surfaces resist wear and corrosion.

These typical MASTER chrome plated parts were displayed at the recent National Metals Show. They include an automatic screw machine spindle, built up .082"; a high pressure steam pump valve; Diesel engine valves; airplane brake strut parts and pneumatic tool parts.

Let us tell you more about Master Chrome Service—and our allied services for tool conditioning and restoration.



MASTER TOOL CO., INC.

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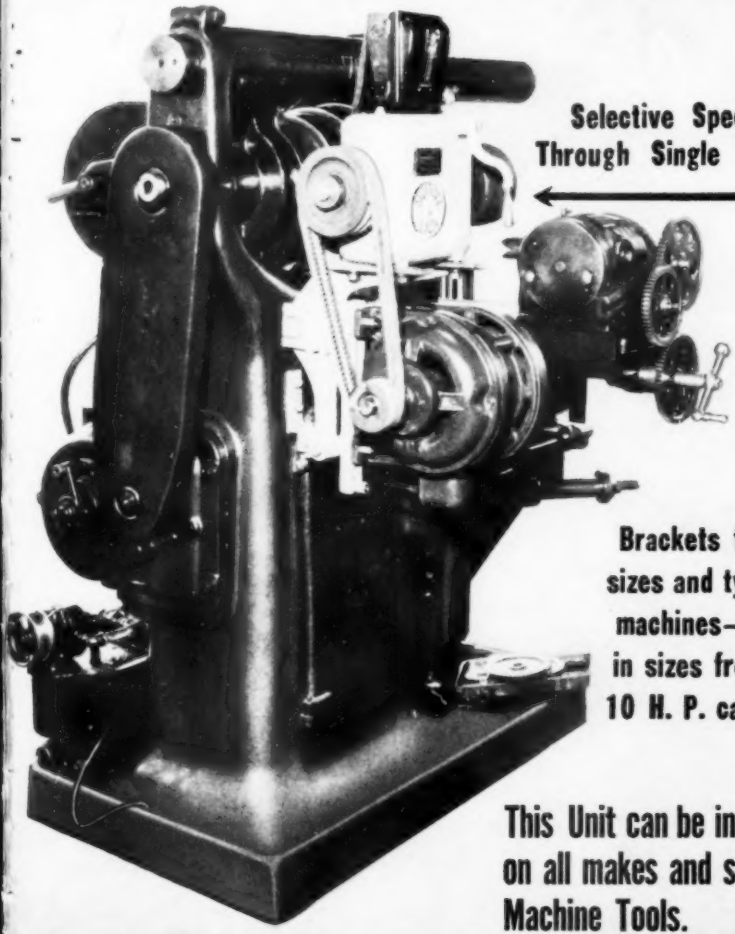
# Typical DRIVE-ALL Installation in a Detroit Plant



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Brackets for all sizes and types of machines—Built in sizes from 1-10 H. P. capacity.

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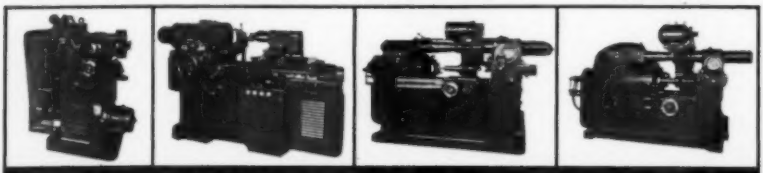


BRYANT CHUCKING GRINDER CO., Springfield, Vt.

# Versatile Hand Tools

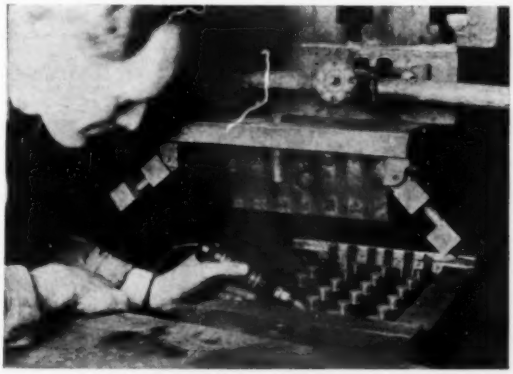
By CARLETON CLEVELAND

THE term "hand grinders" generally brings to mind any type of grinding tool, with self-contained motor, which, when in operation, is held securely in one or both hands. Here, however, it is intended to include only those smaller tools of lighter weight that may be conveniently held in one hand, or with the fingers of both, and used for delicate, exacting work where extreme accuracy and close tolerances are important.

The lightness and compact construction of these small tools—both motor and air driven—permit them to be operated at almost any angle, reaching into and around corners, into blind holes, and in many other places impossible to get at with larger and heavier equipment.

The diemaker finds in these lightweight air or electrically driven grinders, a most versatile tool for precision results on delicate work. These tools are extremely useful, especially in bench work and for correcting any inaccuracies in dies. The making of some slight alterations, touching up, easing of tight holes (even while the dies are on the press), may be accomplished without delays to production or costly tear-downs, the grinding tool being taken directly to the work.

The remarkable power and speed of this type of equipment makes it a wellnigh indispensable tool in every shop. A cut-off tool may be re-sharpened without removing it from the press, saving the take-down time and eliminating prolonged stoppage in production. Operations of this type are frequently and widely performed in the



Cleaning up a Plastic Mold with an Electric Grinder without removing mold from the press.

Cleaning up a Metal Pattern.

textile industry and on other special machinery in various industries. Machine and hand taps, button dies, acorn dies, and thread chasers are easily and quickly sharpened without tearing down the set-up. In large bakery plants, where bread slicers are used, the multiple knives are sharpened with this type of hand grinder without removing the knives or disturbing the tension. Service men carry these portable tools in their kits and find that cash registers, typewriters, adding machines, calculators, and book-keeping machines, can all be serviced quickly and efficiently without tying-up the machine.

These hand grinders have found a useful place among engravers, where the tool enables them to cut away material quickly, accurately, and with effortless control and ease of movement. Precision cutting, carving, beveling, routing, and roughing in wood, plastics, and soft metals is done rapidly and efficiently in minutes where formerly hours were required. In one shop, an air-driven hand grinder is used with an end mill to ream type metal.

Using an Air Grinder in finishing a connecting rod for an airplane engine.

Symbol Marking of Gears for ease in Inspection. A Supplementary Application of the Grinder is the nicking of gears right at the Inspector's machine, eliminating much turning back and forth on part of operator.

In tool cribs, tool rooms, laboratories, stock rooms, and in practically every plant, the marking and re-marking of hardened steel, glass, bottles, porcelain, lead coated stock, and painted surfaces is a constant requirement, generally consuming much time. With

a hand grinder, equipped with a mounted grinding wheel or point, or with a special alloy tip steel tool, this work may be performed almost as quickly as writing on paper with a lead pencil. This facility replaces many slower and less satisfactory methods, and makes possible the proper marking of dies, tools, cutters, and other parts by the toolroom foreman for orderly stock keeping. Manufacturers of special tools, cutters, and dies, may write the company's trade-mark and part number on hardened steel items to facilitate future ordering and reference by the user.

Routing fillet in a pattern, using a steel cutter in an Air Grinder.

A wide variety of accessories gives these light-weight, portable tools a broad range of industrial usefulness. Steel cutters of various shapes and sizes are especially designed for high speed operations on soft metals such as brass, aluminum, magnesium, zinc, babbitt, lead, and tin, as well as both hard and soft woods and plastics. Pattern makers, wood and metal carvers, artists, and artisans, use these high-speed steel cutters for shaping and finishing in minutes' work that formerly required hours, and sometimes days. These cutters, however, are not for use on steel and hardened material. Here the operator resorts to a variety of mounted grinding wheels and points. These stones, permanently mounted on steel mandrels, are available in more than a

Sharpening a Cut-off Tool without Removal.

Touching up a mold, showing proper use of Grinder, in the exact manner in which the tools are held for greatest convenience, — one hand guiding the tool while the other steadies it.

A combination horizontal and vertical drilling set-up.

hundred different shapes and sizes in a wide range of grains and grades. Some are made of aluminum oxide abrasive and are suitable for general universal service. There are others made of silicon or of carbide abrasive

Marking tools for identification.

for use on low tensile strength materials, like copper, aluminum, brass, glass, and some of the plastics. Still others are made of pure aluminum oxide abrasive for grinding high speed steel and other material having a tendency to burn.

Various other accessories have been developed. There are small circular saws for undercutting commutators, while some as small as 3/32 in. diameter are used for slitting and undercutting radial chassis or light detail inlaying. There are small drum sanders as well as sanding discs of coarse, medium, and fine grits for use on both wood and metal. Wheel and cup shaped brushes, as well as straight brush points

Hand grinder held securely in adjustable stand or tool holder. With the stand fastened to the bench, the operator, by using both hands, has perfect control in any delicate operation.

in both wire and bristle are used for cleaning and removing corrosion, oxidation, and all foreign materials. A specially designed wire brush is sturdy enough to cut right through a piece of wood. Such a brush has been found useful for cleaning moulds, small castings, inaccessible places in large castings, caked, baked, or any hard-to-get-off deposit. For polishing, there is a wide assortment of soft rubber and felt

# "You can't beat this SIMONDS BAND ...for Smooth Cutting and Long Life"

SIMONDS HARD-EDGE METAL-CUTTING BAND-SAWS have a tough "backbone" that makes them stand up longer under harder service. The back edge of every blade is heat-treated to prevent stretching . . . and elimination of stretching means less breakage, no shelling of teeth. What's more, these teeth are perfectly milled . . . and evenly set on both sides . . . to assure clean cutting and easy running. And joints are *welded* for extra tensile strength. You can quickly get the Simonds Metal Band you need to cut saw-costs and improve quality on *your* work.

*ASK YOUR DEALER or write direct to:*

**Simonds Saw and Steel Company**

FITCHBURG, MASS.

SIMONDS

FAMOUS FAMILY OF METAL-CUTTING TOOLS

wheels, cups, and points. These various accessories are either permanently mounted on shanks or may be used with any screw type mandrel.

Some of the air - driven tools are equipped with a turbine rotary-valve piston mechanism delivering 6,000 blows per minute, and are used with suitable tools for chipping, chiseling, and grooving. A similar tool, capable of delivering from 500 to 3,000 strokes per minute is used by tool-makers and pattern-makers with an assortment of files. Such combinations are invaluable for filing into blind recesses, filing drafts and clearances, finishing and cavity work.

Another group of accessories in the form of fixtures for securely holding the hand grinders, enables the tool to be converted into a router, shaper, high-speed sprindle carver, or even a precision drill press. These fixtures are accurately made for precision work, with closely machined bases, ground from seasoned gray iron for smooth, vibrationless performance. The height of fixture may be adjusted readily and with the motor unit held securely, the operator has both hands free to guide any delicate carving. The drill press fixture is also adjustable, the work being brought to the drill on a 3-½" machined, ground, and polished table, controlled through a hand knob working on a sensitive rack and pinion gear for extra-sensitive feed. There is a universal stand which permits of the securely held tool being set at any position or angle by merely turning a wing nut which loosens an adjusted ball clamp on the stand. The drills used are suitable for work on soft metal, wood, bakelite, and other comparatively soft materials.

Marking Bottles in a Laboratory.

To the craftsman, model maker, and many other shop and laboratory workers, the light-weight hand grinder, with its numerous accessories, has become an indispensable piece of equipment, worth many times its small cost. The hobbyist also finds in the small speedy electric hand grinder and its wide assortment of accessory tools, a veritable "Open Sesame," leading him into a new world of enjoyment, relaxation, and pleasure.

The gunsmith uses the tool for cleaning and lining up sights, grinding parts, and crowning muzzles. In maintenance work around an industrial plant the electrician finds the hand grinder invaluable in polishing jacks, relays, contacts, removing blemishes and pitmarks, and undercutting commutators.

Indeed, the hand grinder has become a standardized piece of equipment, covering so wide a variety of industrial and other uses that every individual application cannot possibly be mentioned.

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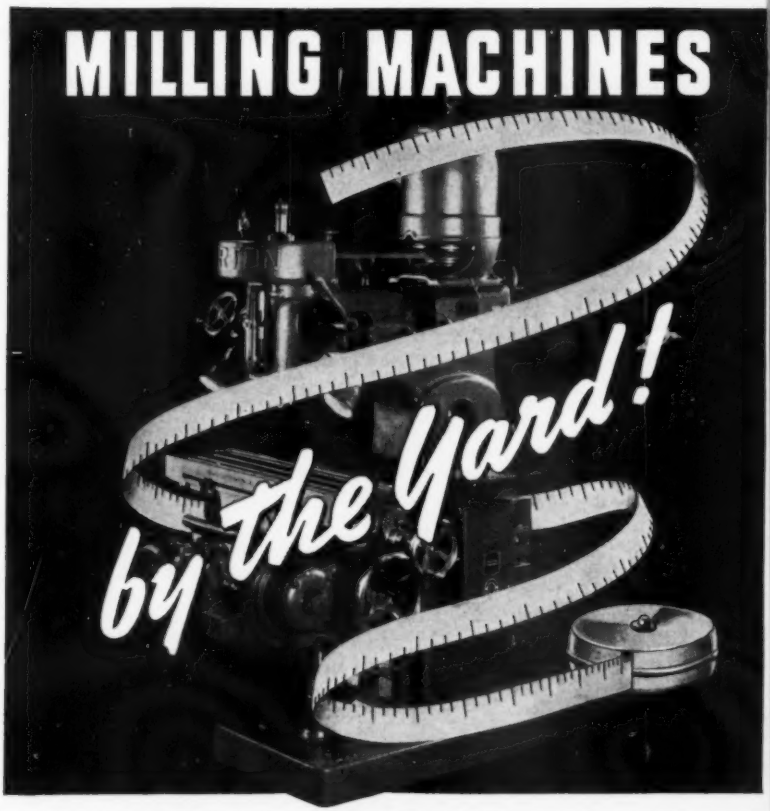
Editor's Note:—We are grateful for photographs used in illustrating this article and helpful suggestions provided by the following:—Chicago Wheel & Mfg. Co., Chicago, Ill.; Dremel Mfg. Co., Racine, Wis.; Independent Pneumatic Tool Co., Chicago, Ill.; Madison-Kipp Corp., Madison, Wis.; Onsrud Machine Works, Chicago, Ill.

# MILLING MACHINES




Not quite, but when buying Gorton Super Speed Millers *you buy* only the speed ranges, feeds and other facilities needed. This means *important savings* to you.

For instance, the standard Gorton Miller may be purchased *with* or *without* power spindle feed, power longitudinal and cross feeds, scales and verniers, dial indicators, coolant pump and other features.

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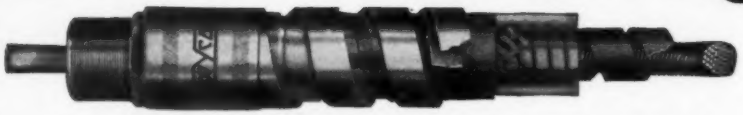
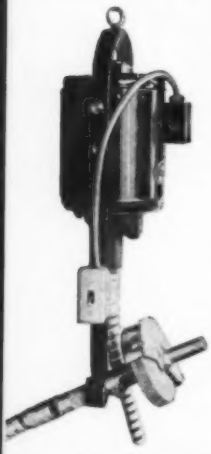


**WYCO PATENTED NON-METALLIC INNER-LINER FLEXIBLE SHAFT**



**No. 5 SUSPENSION TYPE GRINDER**

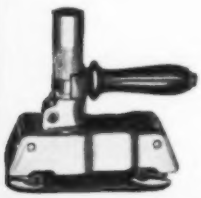
Our WYCO Line of Flexible Shafts and Flexible Shaft Machinery will stand up and "take it" under continuous performance conditions.

The WYCO Line includes all types of Flexible Shaft Machines for all-purpose grinding—polishing—rust and paint removing—snagging castings—weld grinding—sanding—and heavy wire brushing, and for "all around" industrial use.

Various types of machines are offered including light and heavy duty — bench — suspension — floor and cabinet types—as well as models mounted on our WYCO "Roll-Easy" Truck Base.

In our efforts to broaden the selling scope of our Jobbers we have added to the WYCO Line a

**MODEL NO. 00B TOOL ROOM GRINDER**

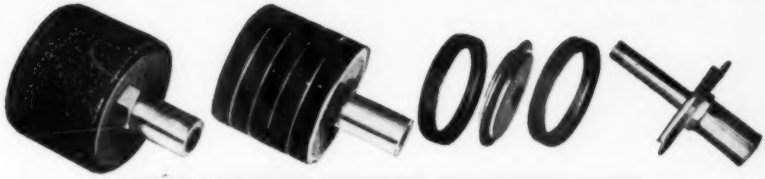


**SHIMMY SANDER**

## WYZENBEEK & STAFF, INC.,

# GUARANTEED!

# WYCO Tools



**WYCO PATENTED UNIFORM EXPANSION DRUM**

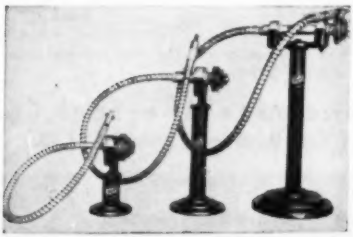
"Shimmy" Sander to be used with a Flexible Shaft. Can be attached to all makes of Flexible Shafts but is particularly engineered for the WYCO. It sands with a back and forth motion the same as a hand operation. The sanding pad is flexible and accommodates itself to flat and curved surfaces.

Begin the New Year by ordering from your local jobber a WYCO Flexible Shaft Machine to suit your particular production need.

***A catalog just off the press will be sent upon request.***

**No. 33 3-SPEED MACHINE**

**3-SPEED JACK SHAFTS**



**836-838 W. Hubbard St., Chicago, Ill.**

Brooklyn Office—1388 Bedford Ave. Canadian Office—Capitol Bldg.

# Sundstrand Balancing Tools are Sensitive, Durable

No. 2 Floor Type Portable

Airport Service Type, 11 ft. Swing

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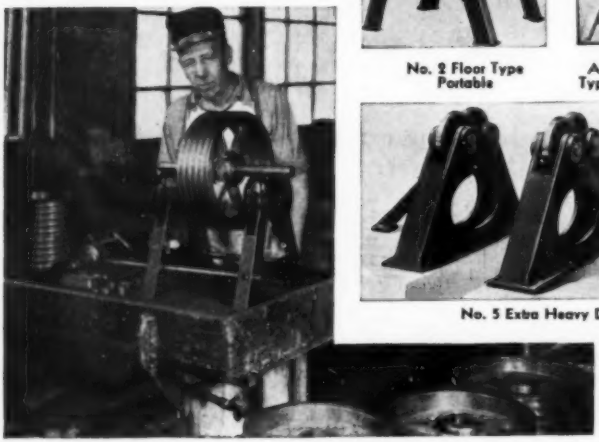

At left is a supersensitive bench type balancing tool in operation.

● Sundstrand Bulletin SBT-436 gives full details on the above equipment. Write for your copy today.

**Sundstrand Balancing Tools** save their cost quickly on balancing, straightening and truing operations. Accurately sensitive and durable; they provide simple, reliable means for checking balance of parts like gears, shafts, flywheels and pulleys. Typical Sundstrand Balancing Tools are illustrated above; representing nine sizes and types which range up to 24,000 lbs. capacity. All except No. 5 Heavy Duty and Airport Service types are fully portable.

**DEALERS**—Sundstrand Open Line Tools . . . Index Bases, Balancing Tools and Bench Centers; offer high quality, big value, excellent opportunities for profitable sales. Investigate.

## Sundstrand Machine Tool Co.

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## RIGIDMILS - STUB LATHES

Tool Grinders - Drilling and Centering Machines
Hydraulic Operating Equipment - Special Machinery

# Carbide Tool Shapes

By JAMES R. LONGWELL

THE day when the application of cemented carbide tools for steel cutting in a shop required a staff of tool engineers and tool designers, the careful supervision of machine tool representatives, the guidance of a metallurgist, and a complete re-education of shop personnel, is past.

The recent rapid strides and developments in the carbide tool industry have resulted in the accumulation of so much data that adherence to simple rules of thumb will enable the average shop, regardless of its production quantities, to employ carbide tooling with its attendant increase in production per machine and per man.

From a tool selection standpoint it is now possible in the average shop to use one standard grade of material for virtually all steel turning, boring (except on modern precision boring machines requiring special tools) and facing operations, while the development of low cost standard tool forms reduces the question of tool design largely to one of selection of the proper tool. In many cases it is possible to produce special tool forms from standard tools by simple grinding operations at a considerable saving in cost over the design and manufacture of such special tools — aside from the time-saving resulting from the availability from stock of standard tools. (See illustrations). As a result it is now possible to cover the tool requirements of 60 to 80 per cent of all carbide op-

FIG. 1

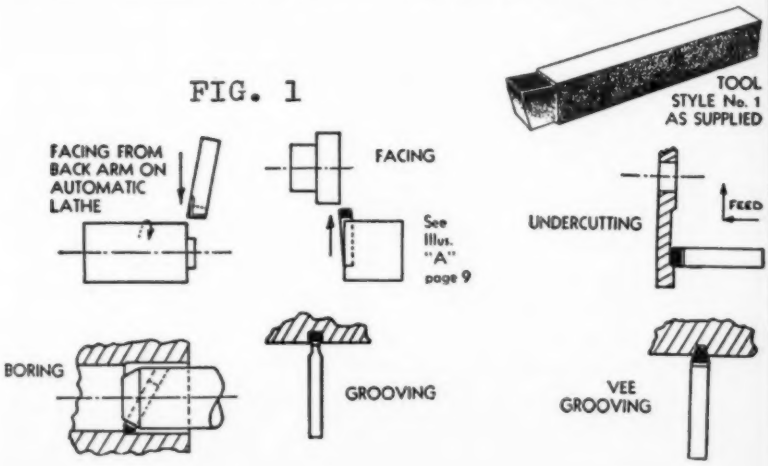
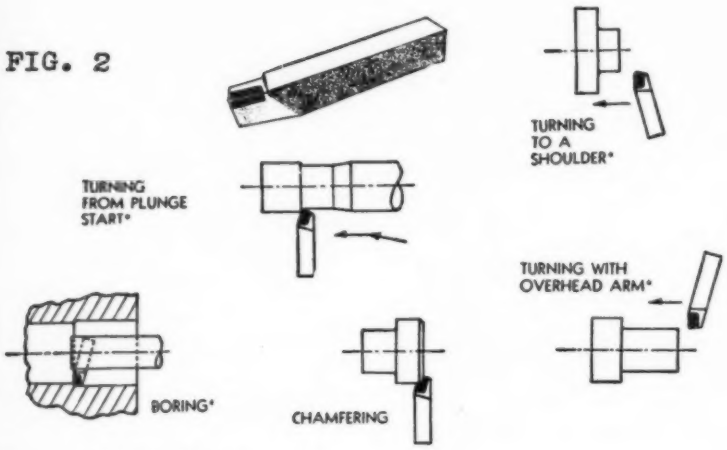


FIG. 2




*Note increased end cutting-edge angle.

erations requiring single point tools through the use of standard tools.

The accompanying illustrations show the simple manner in which these standard tools can be applied to a variety of purposes.

In Fig. 1, the facing tool shown is obtained by grinding the shank of the standard tool shown, at an angle, and then grinding the tip of the tool so that it will be square with the center line of the work.

The undercutting application is obtained by grinding a large radius or chamfer on the corners of the tool nose. The grooving tools are obtained by grinding the sides of tip and shank to the desired angles.

The main differences between the standard tool and the one shown for facing from the back arm on an automatic lathe, is that the nose is ground at a slightly different angle so that the proper clearance is obtained and the cutting edge is parallel with the center line of the work.

Figs. 2 and 3 show similar variations of other forms of standard tools. The boring tool shown in Fig. 3 differs mainly in that there is an increased cutting edge angle and that the shank has been cut off to permit mounting in the boring bar.

In selecting the proper carbide tool for any job, or designing a special tool where standard tools cannot be used, a few simple considerations are sufficient:

**Shanks**

It must be remembered that with carbide tools, part of the steel shank is milled away for the brazing in of the carbide tip. It is necessary therefore, to increase the thickness of the shank over that used for high speed steel tools, to compensate for this recess. It is the shank, of course, which resists the downward, sideways, and twisting cutting pressures. In selecting a tool, pick one with a shank heavy enough to handle ALL the jobs on which the specific tool is to be used.

In addition to strength, the larger the size of the shank, the faster the heat dissipation, a desirable characteristic with carbide tools in view of the vastly higher cutting speeds and chip removal of which they are capable.

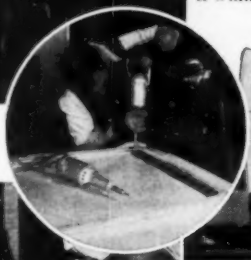
**Tip Proportions**

These should be selected so that when the tool is worn out, there is a minimum of carbide left. Thickness

# Uncanny Accuracy

Glamour in cotton! The textile industry finds many uses for Dumore grinders.

Precision personified! Dumore help produce Pratt & Whitney motors.



Two Dumore No. 9's at work on a production job.

While air hostesses popularize air travel . . . Dumore grinders bring mechanical perfection that greatly increases safety (TWA Photo)

A Dumore "Chief" resurfacing a rubber printing ink roller at the George Lovelock Co., East Orange, N. J.

Heavy grinding, internally or externally, to .0001" accuracy, is "right down the alley" for a Dumore No. 12.

The capacitor-start induction-run motor of the Dumore "Chief" delivers a maximum power output for its size and works at constant speed. The "Chief" is available with one external and five internal quills.

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# Dumore PRECISION Grinders

| DEPTH OF CUT | TIP THICKNESS FOR REGULAR CUTS | TIP THICKNESS FOR INTERRUPTED CUTS, ECCENTRIC FORGINGS, ETC. |
|---|---|---|
| 1/64-3/64" | 3/32" | 1/8" |
| 1/16-1/8 | 1/8 | 3/16 |
| 5/32-7/32 | 3/16 | 1/4 |
| 1/4-11/32 | 1/4 | 3/8 |
| 3/8-17/32 | 5/16 | 7/16 |
| 9/16-3/4 | 3/8 | 1/2 |

should be roughly 50 per cent greater for steel than for cast iron. Tips should be thick enough to allow the tool to be ground on top and yet not be too thin before the area has been reduced to a minimum by regrinding.

A little extra thickness is required for machinery involving interrupted or eccentric cuts, unusually deep cuts, and where machines have considerable backlash.

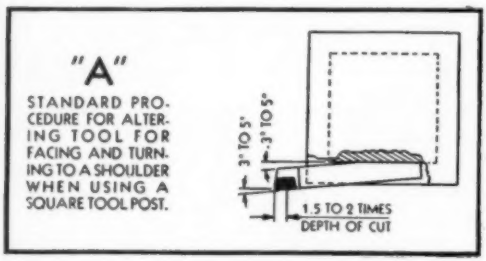
As a general rule, the tip width of a side cutting tool, for instance, should be half the length, since wear and grinding reduce the tip size in about these proportions, under average conditions.

Tools that have been used for deep cuts, when worn down to a point where they will no longer take that depth of cut if designed in such a manner, may then be transferred to lighter work where depth of cut is less.

An accompanying table provides a good guide for selection of tip thickness.

**Grades**

Where lots run 200 pieces or less, the use of a single grade—such as 78B for all steel cutting operations is generally most economical. On large production runs of identical parts, an increase in tool life over the average can often be obtained by experimenting a little with different grades, a little harder or a little tougher than "standard." It is frequently possible to extend tool life per grind in this


"A"
STANDARD PROCEDURE FOR ALTERING TOOL FOR FACING AND TURNING TO A SHOULDER WHEN USING A SQUARE TOOL POST.
3° TO 5°
3° TO 5°
1.5 TO 2 TIMES DEPTH OF CUT

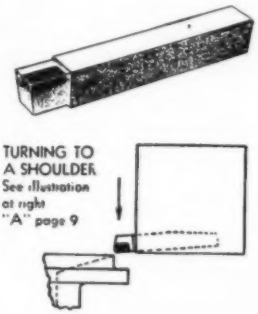
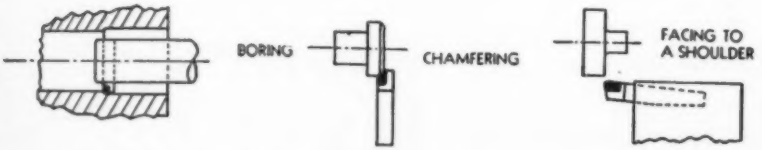



FIG. 3



# Who Uses ROSS Air Control VALVES?

The automotive industry uses them by thousands. T great rubber plants, the large steel mills, the glass a the brass industries, the operators of welding equi ment, the metal working industry with its heavy pun and stamping presses—all these and countless oth Leaders in Their Fields have come to look upon R Valves as standard equipment in their plants.

A company is known by the customers it keeps. R keeps its old customers . . . and adds new ones as t years go by.

*Bring your air control problems to Ross*

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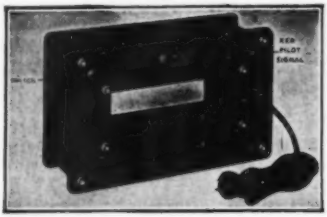
AMC DEMAGNETIZER
A TOOL ROOM NECESSITY



Every tool room needs this simple, portable, sturdy demagnetizer. Small parts passed through the powerful AMC field are instantly demagnetized. Large, flat surfaces can be demagnetized by sliding the device over the surface.

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manner, enough to permit grinding only once every shift, or second or third shift.

**Tool Angles**

Clearance angles merely should be great enough to clear the work after the tool has cut for a short time, with a 7° minimum, up to a maximum of 10 to 12°. On stringy materials, the larger clearance angles frequently are of help.

For steel cutting, side rake should be between 7 and 15°, with 0° back rake. Where chip breakers are used, it is usually advisable to keep the side rake under 10° in order to get best performance from the chip breakers.

The smaller the nose radius the better, since this reduces drag on the point of the tool and increases tool life. A 1/32" radius is about the most desirable. Larger radii should be used only where absolutely necessary.

The end cutting edge angle should be approximately 10° as a minimum, to eliminate drag and obtain a free cutting tool. Where the tool is fed into the work, a 30° minimum is required.

**Tool Grinding**

It is recommended that tools be ground in a central department, assigning one man to the grinding of carbide tools, in order to make him more or less of a carbide tool expert. Such a course not only assures proper grinding, but also frequently results in cost savings, through his advice on tool design and selection based on actual experience in the specific shop in question.

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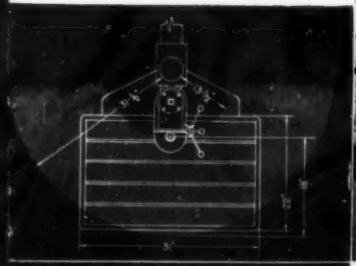

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**TABLE SIZE:** 31" x 22"—machined surface: 28" x 19".

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Height overall: 72"—Width overall: 31"—Depth, front to back: 58"—Shipping weight: 450 lbs.

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**RUN-OUT ACCURACY**—Guaranteed well within all commercial and industrial tolerances. Actually more accurate than many machines costing two or three times as much.

**CAPACITY—RANGE** is illustrated by the drawing above. Note that this machine will drill to the center of a 62" circle. Distances not illustrated are: Maximum distance nose of chuck to table: 13¾"—Vertical traverse of spindle: 3¾"—Column diameter: 3¾".

*N. B.—The new Walker-Turner Radial Drill when locked in drilling position is extremely rigid and has a minimum deflection. The drill may be tilted to 45° either right or left with relation to the table*

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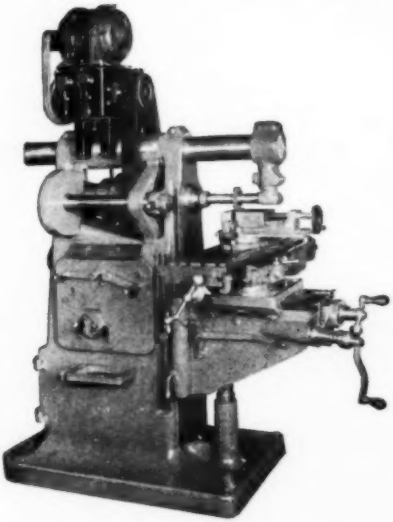

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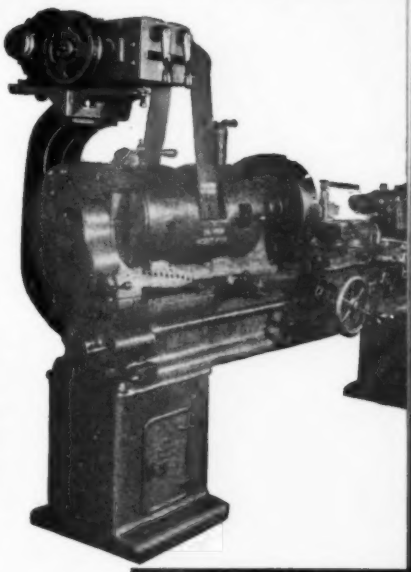

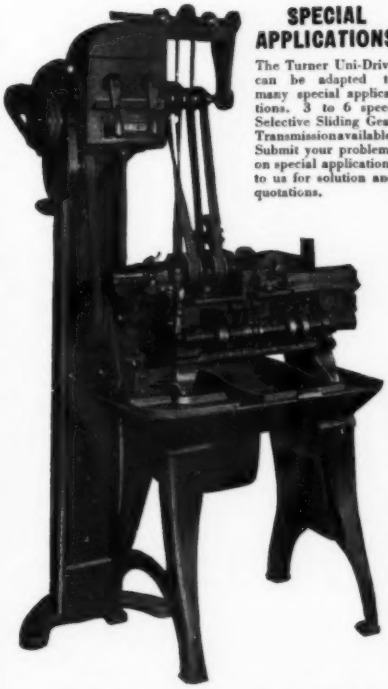

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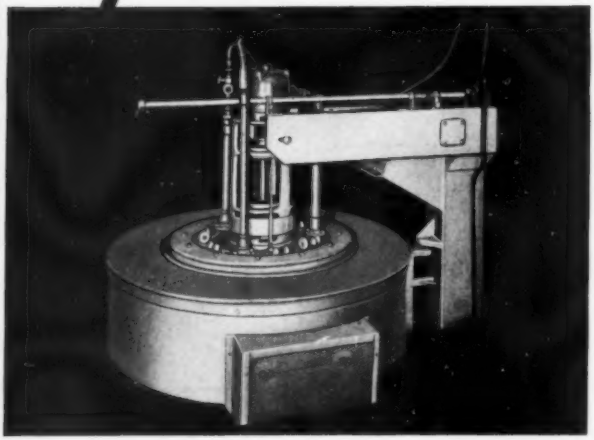

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# Supplementary Factory Lighting

By DEAN M. WARREN

As we begin to appreciate the significance and implications of lighting in the broader sense, the need for fitting the lighting more definitely to each specific task becomes apparent. This means that while certain arbitrary standards of general illumination can be set up, they embrace general conditions only. Beyond this, seeing tasks of all degrees of severity are encountered in the machine tool field that dictate specialized lighting, in reality "tailored" to the task.

This tailor-made lighting is called supplementary or local lighting. As the name implies, however, it is a supplementer and not a supplanter of general lighting. In fact, general lighting is important for traffic and general seeing in the industrial world. Besides being of direct help to the worker, it is far better than localized lighting would be by itself. The addition of local lighting to good general lighting is an effective answer to the problem of providing adequate lighting for critical seeing tasks which require more light that can be provided economically by the general lighting alone.

**Footcandle Requirements**

In the preceding article, lighting values were given for typical operations performed in the machine tool field. This list also included recommended footcandles for supplementary lighting. Briefly, the amount of light required depends on several factors and for purposes of classification, seeing

(Left) Glare and poor contrasts result when an unlouvered supplementary unit is used without general lighting as shown in top illustration. Glare is eliminated by louvering as shown in center illustration, but contrasts are bad. Bottom view shows proper use of supplementary lighting in connection with general lighting. Here the mechanic has a high level of illumination at his work, yet contrasts are excellent. In this instance, ratio between general and supplementary lighting is only 5 to 1.

tasks fall into three groups, depending on the difficulty of the task.

Group A—These seeing tasks involve (a) the discrimination of extremely fine detail under conditions of (b) extremely poor contrast (c) for long periods of time. To meet these requirements, illumination levels above 100 footcandles are recommended. To provide these values a combination of at least 20 footcandles of general lighting, plus specialized supplementary lighting is necessary.

Group B—This group of visual tasks involves (a) the discrimination of fine detail under conditions of (b) fair contrast (c) for long periods of time. Illumination levels of 50 to 100 footcandles are required. To provide illumination of this order, a combination of 10 to 20 footcandles of general lighting plus specialized supplementary lighting is necessary.

Group C—These seeing tasks involve (a) the discrimination of moderately fine detail under (b) better than average contrast (c) for intermittent periods of time. The level of illumination required is of the order of 30 to 50 footcandles and in some instances, it may be provided from a general lighting system. Often, however, it will be found more economical, yet equally satisfactory, to provide from 10 to 20 footcandles of general lighting and the remainder from specialized supplementary lighting.

**Supplementary Equipment**

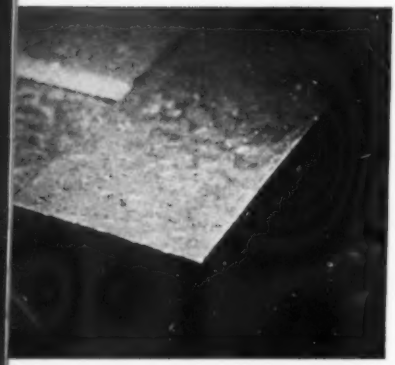
Two broad classifications take in all supplementary lighting equipment, namely: — concentrating and diffusing. The former is intended to augment the lighting over restricted areas, whereas the diffusing type may also serve as the general lighting system for restricted areas, such as workbenches, inspection tables and the like.

There are many different types of concentrating units on the market today. This type requires louvering, oth-

(Right) Supplementary lighting of 100 footcandles is provided at drill press shown in top illustration, by a well louvered concentrating source equipped with a 200-watt lamp. Because of the type of seeing done at a lathe, it is desirable to provide both diffused and directional light. This large-area low-brightness unit (in the lower illustration) provides approximately 50 footcandles of well diffused illumination for reading micrometers, indicating scales, etc., while the concentrating source is used for projecting light into deep borings.

erwise direct glare may result. Units of this type may be attached to the machines, the ceiling, side wall or conduit four or five feet from the work. There is an advantage in having the unit up out of reach of the workman, for once properly aimed, it should remain in this position. So frequently, a bench unit of the half-shade variety is carelessly swung by the workman to a position where it does not annoy him, but where it becomes a source of annoyance to his fellow workman at an adjoining machine. Furthermore, if the lamp is readily accessible to the workman, he may remove the bulb and connect to his outlet, some other piece of equipment. Many times the bulb will be knocked off the machine and not immediately replaced and the workman will not have the light required for his task.

The diffusing type, termed large-area low-brightness sources, was developed in the course of a study made by the Illuminating Engineering Society on the lighting of imposing stones in printing plants. This study indicated the need for a large-area source of relatively low brightness and one was consequently developed. Since then, many have made their appearance on the market. The original type consisted of a luminous element of white diffusing glass, mounted in a box containing lamps. Among the present ones is a unit employing a bank of Mazda F lamps with suitable reflecting surface to insure reasonably uniform brightness. Another is in effect, a mat-white suspended ceiling illuminated by a trough reflector below the ceiling element. A fourth device consists of the same type of suspended ceiling illuminated by silvered bowl lamps placed below the ceiling. Each of these has distinct advantages which recommend it for a particular purpose. The silvered bowl unit is more efficient than other units employing filament



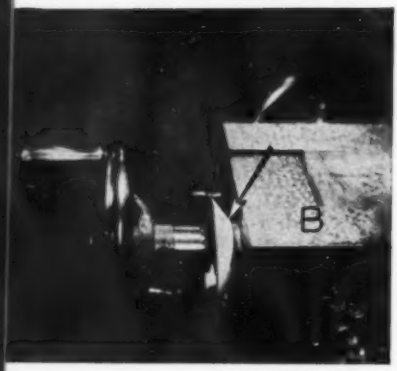


Fig. A at the top (left) shows how a graduated feed indicating scale appears when lighted by general overhead lighting. (B) Add a reflecting collar and at "C" we observe how the dial appears.

lamps. Furthermore, it will require less maintenance and better retain its efficiency between cleanings since there are few dust-catching surfaces to reduce light output.

This general class of unit can be used as a supplementary lighting device when added to an existing general lighting system. In adequate lengths or spacings, this type of equipment can be used as the entire lighting system providing a high level of illumination of the proper quality at the work points, and at the same time, providing sufficient light throughout the room for satisfactory contrast conditions.

**Fitting Equipment To The Task**

Adequate lighting alone is only part of the story of providing good seeing conditions in a plant. Quality of lighting is equally important and this is dependent on the type of equipment that is selected for lighting a given task.

The importance of selecting the right equipment for the job is shown in a study made by the Illuminating Engineering Society on "Lighting for the Machining of Small Metal Parts."

This research was conducted in a plant which was well lighted, according to present-day practice. The study was confined to representative major operations. These were found in the tool room and included the operation of machines such as lathes, grinders, millers, shapers, drill presses, bench work and inspection of metal surfaces.

The setting up and operation of these machines, presents similar seeing tasks. The precision of such machine operation usually depends upon the accuracy of the set-up and the careful use of the graduated feed indicating scales rather than the observation of the cutting tool or its path. The work is usually checked by portable measuring instruments and only in rare cases is a precision cut made to a scribed line.

The fundamental seeing task then becomes the discrimination of detail

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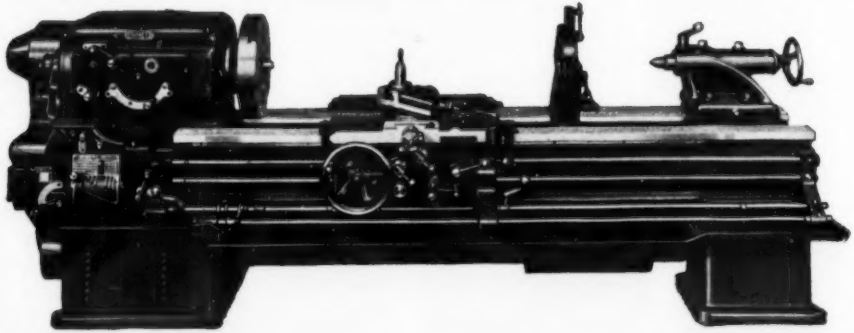

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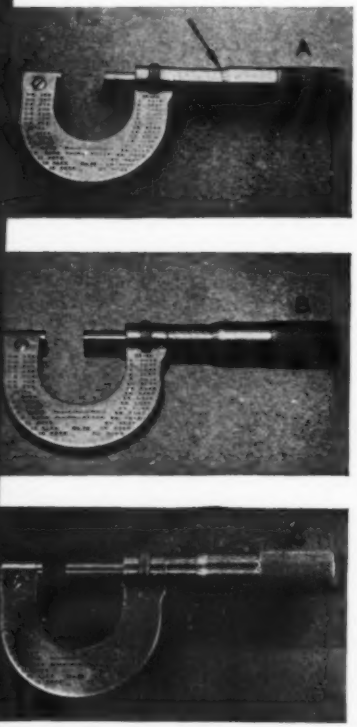
on plane or curved metallic surfaces. r example, distinguishing cut divi- ns on scales, micrometers, dials, etc.




Upper illustration (A) shows micrometer illuminated by a large-area low-brightness source and markings on the barrel are clearly visible. Center illustration (B) shows how they look when lighted by a concentration source. (C) Shows the effect of general overhead lighting.

n this instance, the micrometer was elected for the initial experimental ork because of its portability, its uni- ersal use in metal working and lastly, ecause the seeing task involved in eading a micrometer was similar to ost of the tasks encountered.

The illustrations show the appearance of the micrometer when lighted by different types of equipment. Decidedly, the best visibility was obtained when the micrometer was lighted by a large-area source of low-brightness, whose reflection on the barrel was a band of sufficient width to form a uniformly bright background for the figures and divisions that must be seen.

The same number of footcandles was provided on the micrometer by the concentrating type source, but the result is a narrow brilliant band of glare which obscured the remainder of the micrometer because of the harsh reflections. So, the right unit for the job is highly important.

In addition to selecting proper equipment for a given task, improvement in seeing conditions often can be made by using a little ingenuity. For example, notice how the visibility of the graduated feed indicating dial illustrated, is improved by the simple expedient of installing a small reflecting surface adjacent to the scale and at a 45 degree angle with the horizontal. As may be expected, the reflection of this surface provides a lighter background for the numerals and divisions.

**Balancing The Lighting**

Where supplementary lighting is employed, care must always be used to avoid uncomfortable contrasts between the well-lighted work area and the surrounding area, by providing a sufficient amount of general illumination of the proper quality. Otherwise, the eye must compensate for rapid changes in the amount of light which enters it. Everyone undoubtedly, glances away from his work at frequent intervals, usually for momentary relaxation. But if the contrast is too great, instead of rest, the eye rapidly becomes fatigued from the continuous adaptation of the retina and pupil to the widely different brightnesses encountered. Under average conditions, a ratio of 10 to 1 in footcandles is generally satisfactory. This means that for every 100 footcandles of supplementary lighting provided, there should be at least 10 footcandles of general lighting.

### Maintaining The Lighting System

After a lighting system has been installed, it can be maintained at high efficiency only by a well-planned cleaning schedule. Dust and dirt inevitably collect upon the reflecting surfaces of the equipment and unless cleaned periodically, will result in an extremely inefficient installation. Even a barely discernible layer of dust frequently decreases the light output as much as 30 per cent. For this reason, a schedule of cleaning the units with soap and water at intervals (not greater than six to eight weeks in the average plants) is recommended.

By providing a good seeing environment through fitting the lighting to the task, management receives direct compensation in the tangible form of increased production, decreased spoilage, fewer accidents, etc. These are essential if our Defense Program is to move forward with acceleration.

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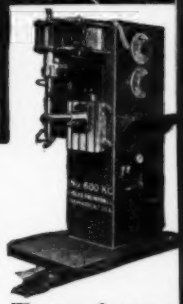

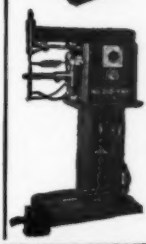

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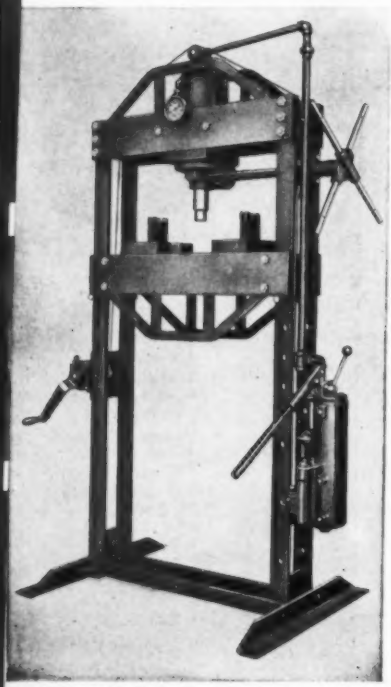

KRW Hydraulic Arbor Presses are designed for "one man" operation. The table can be quickly raised with one hand to eight convenient heights by means of the crankhandle and raising mechanism. A ratchet prevents the table from dropping if the crank is accidentally released.

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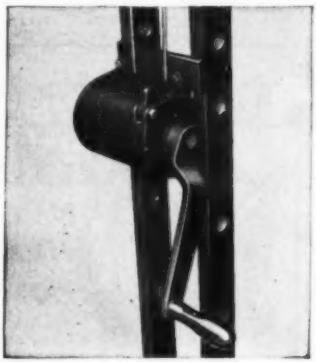

Closeup showing crankhandle, enclosed drum and ratchet for lowering table.

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# Welding Design

## (PART III)

By R. A. GAST, M. E.

BY the third, or precise, method, unit stresses are figured carefully and the design is worked out in detail to meet service conditions very accurately. Where weight and performance are factors of utmost importance, then it is desirable to use this method to determine the unit stresses and required dimensions of material to obtain the most efficient utilization of material.

### Roll Changing Hook

As an example of the precise method of design in an assembly of simple elements, consider a roll changing hook. This is a hook to change rolls in a steel rolling mill. Dimensions and weight of the roll are given. Certain clearances for the hook are given. The hook is to be built so that the roll will be horizontal when carried in the hook. So that the point of suspension will not have to be altered to make the hook hang vertically when empty and loaded with different weight rolls, the hook is to be suspended on the center line of the rolls and counterbalanced.

In our solution of this problem, the values for stresses, etc., are for illustrative purposes and may be modified to suit specific applications.

The solution assumes that the extra weight of the commercial sections used is more than offset by the cost of calculating and fabricating sections of minimum weight.

Clearances are as shown in Fig. 1.

Calculated weight of roll—39,000 lbs.

First Assumptions:—Straight sections of hook to be wide flanged I-beams. Curved section of hook is to be I-beam section, built up of three plates rather than attempting to bend the I-beam to the small radius necessary. Stresses allowed:—12,000 lbs., in steel and 7,000 lbs., in welds, to allow for abuse in service.

Rough calculation to determine approximate size of beam:

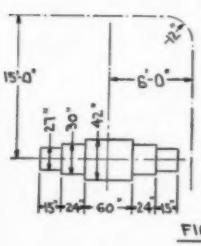
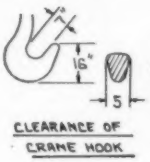



FIG. 1



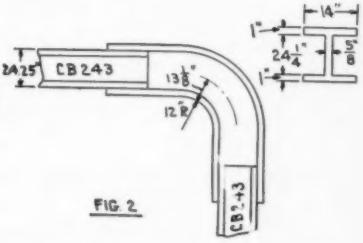




FIG. 2

Fig. 1—Sketch showing clearances of crane hook. Fig. 2—Design for curving portions of hook.

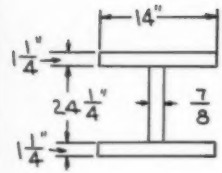



FIG. 3

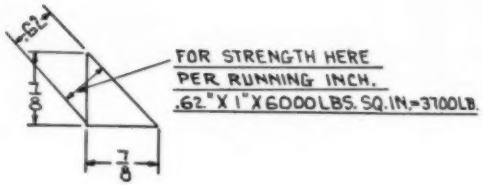



FIG. 4

Fig. 3—Sketch of beam section of hook. Fig. 4—Sketch for calculating strength of fillet weld.

Moment/Stress times equals Section Modulus

(72" plus 12") [39000 lbs. (Roll) plus 7000 lbs. (Hook)] equals 320

12000

From the U. S. Steel "Pocket Companion" CB-243 has section modulus 330 to 413, and is 24" high with 14" flanges, which are good proportions for the purpose.

The stress in the compression flange should be reduced on account of lateral deflection (see discussion of American Institute of Steel Construction Specification — Pocket Companion, Page 184) which is the only recognized formula available but applies to floor or similar uniformly loaded simple beams. Beam under consideration is much more complicated than this, being curved, and reactions applied in different manner, which would induce greater lateral forces, but about two-thirds of the length is in tension, which will reduce lateral deflection. The length of the compression flange is about 25 feet or about 22 times the width. The specification for simple beams reduces the tubular load (for length over width equals 22) to about 90%. For the conditions of this beam reduce the load on the compression flange to about 90% or 10,800 lbs. per sq. in.

The beam section roughly calculated above, CB-243 section modulus 330 has section area of 38.21 sq. ins. On an assumed total load or 46,000 lbs., roll and hook, the tension on the vertical portion of the hook throughout the I-beam superimposed on the cross bending is 46,000 lbs. / 38.21 sq. ins. equals 1200 lbs. sq. in. By a coincidence, this 1200 lbs. sq. in. is exactly the amount it was decided to reduce the load on the compression flange (which also reduces the load on the tension flange) and the beam roughly calculated is suitable for the vertical side of the hook. (If this superimposed tension had been greater or less, the size of the beam would be increased to suit the allowed stress on the tension or compression flange respectively.)

In the top horizontal curved portion of the hook, this tension effect is not apparent. The built up curved portion of the hook will reduce the moment arm and hence the bending stresses in the I-beam section by about two feet or more than a quarter. As this is much greater than the reduction decided for the compression flange, the I-beam section roughly calculated will do for this part too.

In a curved beam, the stress on the inner flange is more than the stress in a straight beam of the same section at the same moment. (See Handbook of Engineering Fundamentals, Eshbach, Page 5-33 and 5-34.)

"12. Curved Beams"

"The derivation of the flexure formula, s equals Mc/I, assumes that the beam is initially straight; therefore, any deviation from this condition introduces an error in the value of the stress. If the curvature is slight, the error involved is not large, but in beams with a large amount of curvature, as hooks, chain links, frames of

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THE UTILITY SLEEVE cuts small tools at least 40% (some users report 75%). This removable taper shank tool driver is used with taps, drills, countersinks, reamers, end mills, center drills, counterbores, woodruff cutters, taper pin reamers, etc. The sleeve is a two jaw collet in action, fitting over the diameter of the shank of tool, which is positively driven by flats or the tang on shank end.

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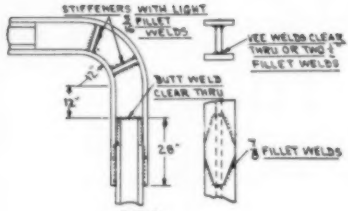



FIG. 5

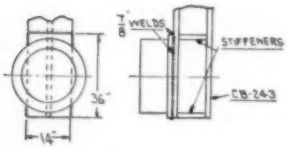



FIG. 6

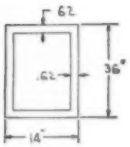



FIG. 7

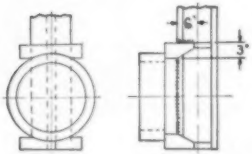



FIG. 8

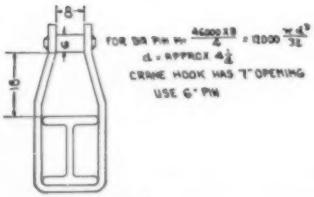



FIG. 9

Fig. 5—Details on method of making welds. Fig. 6—Socket for engaging the end of the roll. Fig. 7—Section modulus of weld. Fig. 8—Wings added to casting to engage stiffeners. Fig. 9—Top clevis of hook.

punch presses, etc., the error involved in the use of the ordinary flexure formula is considerable. The effect of the curvature is to increase the stress in the inside and to decrease it on the outside fibers of the beam and to shift the position of the neutral axis from the centroidal axis toward the concave or inner side.

"The correct value for the fiber unit stress may be found by introducing a correction factor in the flexure formula, viz., s equals KMc/I; the factor K depends on the shape of the beam and on the ratio R/c, where R equals distance, inches, from the centroidal axis of the section to the center of the curvature of the central axis of the unstressed beam; and c equals distance, inches, of centroidal axis from the extreme fiber on the inner or concave side. Seely's Advanced Mechanics of Materials contains an analysis of curved beams and also Table VII which gives values of K for a number of shapes and ratios of R/c. For slightly different shapes or proportions K may be found by interpolation with a fair degree of approximation."

Assume the design shown in Fig. 2 for curved portions.

Section modulus equals 400
Area section equals 43.2 sq. in.

Bending stress on inner tension flange is increased (see Eshbach, Page 5-34 next to bottom figure right hand column, for

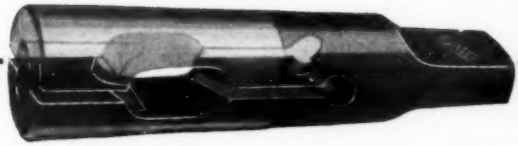
$$R/C \text{ equals } \frac{25\text{-}1/8"}{12"} \text{ equals 2.1) about 1.33}$$

Tension in vertical portion of this member increases stress in tension side 46000 lbs. / 43.2 sq. in. equals 1060 lbs. sq. in.

Beam should be calculated as straight beam in bending only for stress of

$$\frac{12000}{1.33} \text{ -- 1060 equals 7940 lbs. sq. in.}$$

# GLENCO UTILITY TOOLS



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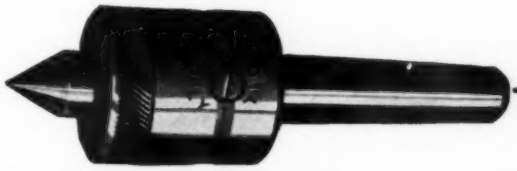

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Check assumed design:
46000 lbs. x 84″
——————— equals 9660 lbs. sq. in.
400

Beam section assumed should be increased: 9660 / 7940 equals 122%.

Make curved portion of this section as shown in Fig. 3.

Calculations of principal welds:—

Make welds to develop full strength of members used. Use ⅞″ fillet weld to connect flanges of curved and straight portions.

Strength of ⅞″ fillet weld is derived as shown in Fig. 4,
14″ X 1-¼ X 12000
——————— equals 57 ins. weld
3700

Weld web to flanges clear through with "V" welds or two ½″ fillet welds. This is more than actual requirements for shear.

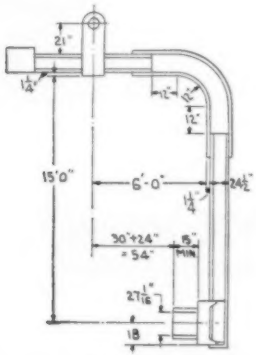

FIG 10

Fig. 10—Appearance of hook at advanced stage of design.

Make welds as shown in Fig. 5, so that there will be no abrupt change in section of flanges and no heavy welds directly across an important tension member.

The socket to engage the end of the roll, as shown in Fig. 6, would be cheaper as a steel casting than a built up welded construction. Check to see if sufficient welding can be developed on this design.

Assume, to be safe, weld fails by tension on top and compression on bottom, turning through center rather than turning on bottom.

Section modulus of weld (refer to Fig. 7)—

Section modulus equals 550

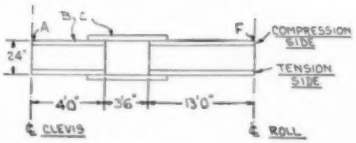

FIG 11

Fig. 11—Sketch for calculating deflection.

Section modulus required equals
46000 x 84
——————— equals 644
6000 lbs./Sq. In.

Section modulus above section deficient by 644—550 equals 94.

Add additional welding at top and bottom of above rectangle:
94
——————— equals 5
.62″ x 36 (about)

Add wings to castings to engage stiffeners between the flanges of the beams, as shown in Fig. 8.

A 6″ horizontal dimension of wings adds 6″ welding at top and 3″ vertical dimension eliminates 3″ weld, giving 6″ net weld on two welds at top and 6″ net on bottom.

Top Clevis, (see Fig. 9).
Bearing on Pins: 46000 / 4 x 12000 equals 1″ thickness for two plates, or ½″ plates. Use at least ¾″ plates, or better, 1″ plates to provide side stiffness.

The hook now appears as shown in Fig. 10.

Approximate calculation of deflection is as follows (refer to Fig. 11):

# Porter-McLeod

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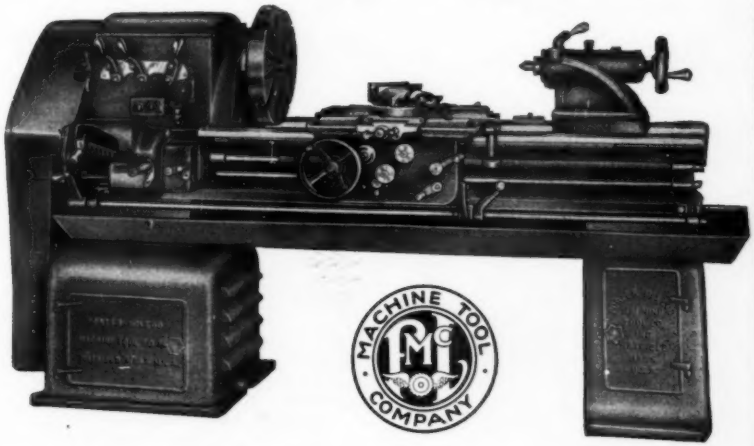


## 16 Inch—12 Speed—Geared Head—Quick Change

| | |
|---|---|
| Swing over bed | 17" |
| Swing over carriage | 11½" |
| Dist. bet. centers (6' bed tailstock flush) | 36" |
| Dist. bet. centers (tailstock overhung) | 40" |
| Tailstock spindle travels | 5¼" |
| Tailstock spindle diameter | 2¼" |
| Taper of Centers | No. 3 Morse |
| Front spindle bearing | Timken |
| Rear spindle bearing | Timken |
| Hole through spindle | 1 5/16" |
| Diameter threaded nose | 2 3/16" |
| Number of threads on same | 7 per inch |
| Number of threads and feed changes | 40 |
| Stand. lathe will cut following threads per inch: 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼, 3½, 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 16, 18, 20, 22, 23, 24, 26, 28, 32, 36, 40, 44, 46, 48, 52 and 56. | |
| Leadscrew threads per inch, Acme thrd. | 6 |
| Width of Belt | 2½" |
| Steady rest opening | 4½" |
| Driving pulley diameter | 9" |
| Revolutions per minute | 410 |
| Highest gear ratio | 42 to 1 |
| Number of spindle speeds | 12 |
| Minimum & Maxi. speeds | 15 to 500 R.P.M. |
| Weight on skids (6' bed) | 2800 lbs. |
| Weight crated (6' bed) | 2900 lbs. |
| Wt. boxed for Ocean shipments | 3425 lbs. |
| Export boxes (6' bed) | 102" x 38½" x 62" |
| Weight per extra foot of bed | 100 lbs. |
| Size of tool | 1¼" x ⅝" |
| Largest diameter held in split chuck | ⅞" |
| Lathes furnished with 5, 6, 7, 8 and 10 foot beds. | |

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|---|---|---|
| A | 0 | 0 |
| B $\frac{48 \times 46000}{330}$ | 6.700 | 6.700 |
| C $\frac{48 \times 46000}{500} \times \frac{.85^*}{1.33^*}$ | 5.900 | 3.700 |
| D $\frac{85 \times 46000}{500} \times$ | 10.500 | 6.700 |
| E & F $\frac{85 \times 46000}{330}$ | 11.800 | 11.800 |
| Deflection AB $\frac{6700/2}{33000000} 48$ | .0049 | .0049 |
| CD $\frac{5900 \text{ plus } 10500}{33000000 \times 2} 42 \frac{3700 \text{ plus } 6700}{33000000 \times 2} 78$ | .0105 | .0124 |
| EF $\frac{11800}{33000000} 156$ | .0558 | .0058 |
| | .0712 | .0731 |

Angle of deflection is about:

$\frac{.0712 \text{ plus } .0731}{24 \text{ depth of section}}$ equals .072"/12"

Deflection-roll in socket is 1/16" in 15" length, or .04 in 12".

To hold roll, horizontal socket should be tilted above horizontal:—.07 plus .04, or about ⅛" per foot.

The calculation of the counterweight is simple, and need not be worked out in detail here.

This is the third in a series of three articles. Part I and Part II appeared in November and December issues, respectively.

*Factors from Eshbach, Page 5-34

## "Chatterless" Countersinks

The Severance Tool Mfg. Co., 1510 E. Genesee Ave., Saginaw, Mich., offer a new bulletin, No. 12-E, describing their standard and heavy duty countersinks. The manufacturers emphasize that the cutting teeth of Severance "Chatterless" Countersinks are so arranged as to give a shearing cut and make chatter almost impossible. This bulletin lists the specifications of the countersinks carried in stock.

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Duro Drill Presses give you weight, rigidity and accuracy—Three essential requirements for heavy loads. The main head casting is made of high quality close-grained gray iron. It is heavier and better ribbed than the castings usually found in Drill Presses of this type. The quill is 2 inches in diameter—also larger than usual and precision machined. The spindle pulley mounting is a part of the main head casting insuring a permanent mounting on which wear is not possible.

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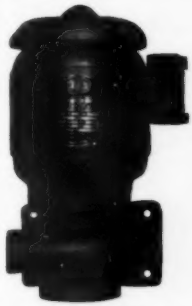
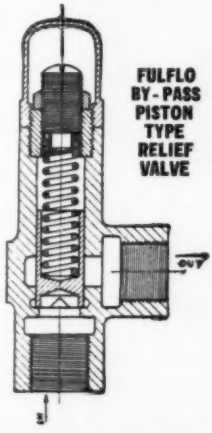


**Symbol FVM**
**Vertical Type**

**Symbol FHM**
**Horizontal Type**



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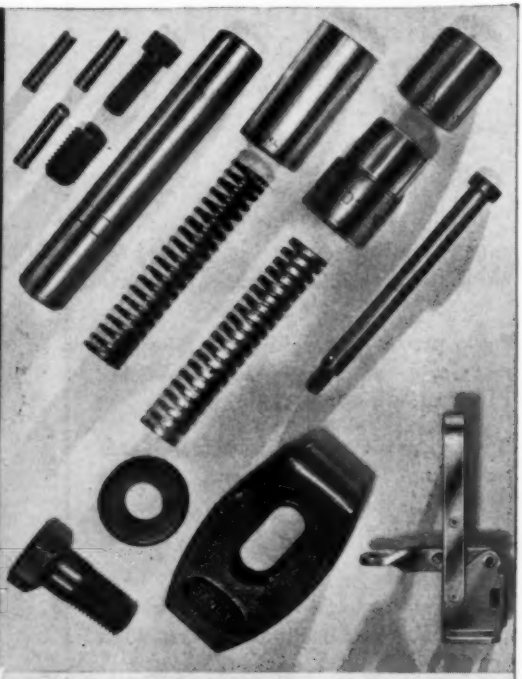

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**DANLY DIE SETS and DIE MAKERS' SUPPLIES**

# Modern Handling Equipment

By GEORGE A. FAIRMAN

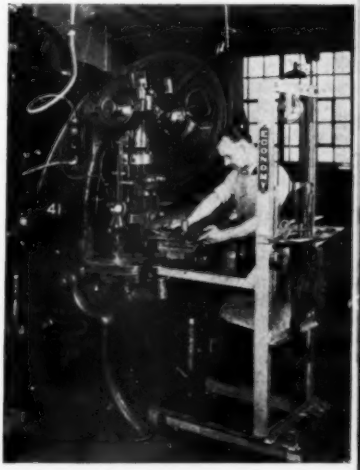
INGENUITY is meeting a multitude of needs in industrial plants. Take for instance the lifting of heavy dies, stacking boxes of material, skids, pallets, drums, heavy castings, and the hundreds of other lifting and conveying jobs of heavy pieces or loads, which may now be handled with ease and efficiency with modern lifting and carrying equipment recently developed.

These lifters may be hand operated, and transport from one part of the plant to another. In many plants these are now handled with lift trucks—being taken from the die racks to the presses and returned to their proper places after runs are completed. Such trucks are often equipped with hydraulic lifting mechanisms. The same equipment also may be used in handling material, to and from machines, relieving the operators from drudgery, saving time and increasing production.

In handling dies, the machine is taken to the die rack, the platform is raised to the desired height, the die slid onto it, and the entire load taken to the press, where the platform is adjusted to the proper level, and the die slid into place. On completion of the job, the procedure is repeated in reverse.

Tese lifters may be hand operated, hydraulically or electrically powered, in capacities ranging from 500 to 5000 pounds, and even more. Automatic safety devices are provided to hold the loaded platforms in case a cable should break.

Lifting equipment also is useful in the handling of tote boxes containing small parts to be machined or finished. No longer need the contents of tote boxes be emptied onto the floor alongside the operator, or on low tables compelling the operator to stoop to pick them up as he proceeds with his work piece by piece. With lifting equipment the boxes are picked up and brought to the operator and placed on tables of proper height. Such boxes are frequently made with removable or hinged ends so that as the level of the contents of the box goes down, the end may be removed, or if hinged, it may be opened to lie flat on the table, rendering the balance of the box's contents more easily acessible.



Lifting and conveying equipment of this type is comparatively inexpensive

nd goes far in relieving workers of evere handling tasks, reducing fatigue nd increasing safety. Carrying heavy oxes, reaching over, picking up, and traightening the body to its normal orking position requires much more me than is generally realized, while he repeated stooping, bending, stretch-ng and reaching movements are fa-iguing.

A plant in the Middle West, engaged n steel stamping, not only saved thou-ands dollars by the use of automatic ifting equipment for handling materi-l to and from presses and machines, ut greatly reduced the accident toll.

Lifting equipment is also efficient in naintenance work in an industrial lant. A surprising amount of work an be done in cleaning operations or epairing, moving, or replacing over-ead installations of motors, fans, or eavy shafting. The platform of a tele-cope model is inverted and raised to he full height of the framework so hat heavy objects can be slid onto the leck safely and easily, and then low-red. Far safer is it to use equipment f this type for work at high points han to depend on stepladders.

The "Economy" lifter is made by Economy Engineering Co., 2635 W. Van Buren St., Chicago.

## Lyon Announces New Model

A new hydraulic elevating table is announced by Lyon Iron Works, 586 Madison St., Greene, N. Y.

It is recommended for moving dies n and out of presses or storage spaces; ifting or supporting overhanging work n drill presses or other machines; ransferring heavy materials or parts. t makes a convenient adjustable and portable work-table or bench to bring work to proper height for operator.

It is **hydraulic**—the table is elevated by short, easy strokes of the pedal. Lowering is also by conveniently located release pedal. This leaves operator's hands free. The table is guided so it cannot swivel as related to the base. Base is of same size as table, which allows the table to be pushed up close to a machine. Casters are located at the extreme corners of the base for stability. Truss tubes run from center column to base directly over casters, thus transferring load to the point where it should be carried, directly over the casters.

Capacity is 2,000 lbs. size table—24" x30", lowered height — 28", elevated height—42", casters—two stationary and two ball bearing swivel. Wheels—4" diameter with roller bearings, lubrication—hydraulic grease fittings in all wheels and in forks of swivel casters. Weight—350 lbs.

## Johnson Multiduty

The O. Johnson Mfg. Co., Brookfield, Ill. offers an improved, Multiduty die truck.

It is precision built, electrically welded, has roller bearings, heavy duty casters, enclosed gears, and the rate of rise (table) is 16" per minute at 120 r. p. m. Two sizes, B-1 and B-2, are available.

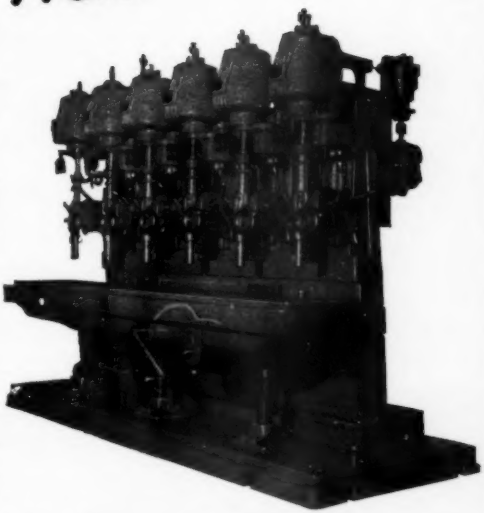
B-1 handles dies up to 40" long. Overall length is 44", Overall width 28" and Overall height is 66". Size of table is 28"x40". Table maximum height from floor is 40" and minimum height is 24". Safe load, table, 3000 lbs. Safe load, overhead 1600 lbs. Swing between table & overhead shaft (table up) 24" Swing between table and over-

# Extra

## CANEDY-OTTO

*New*

## 6 Spindle Drilling Unit



Meet the increasing production schedules with this time saving precision drilling unit. Designed and engineered to do the greatest amount of work in the least possible time.

Full ball and roller bearing. Each head individually driven and controlled, with a separate geared power feed and eight spindle speeds—four by means of open belt and four through back gear concealed in spindle column. Eight-step sheave type pulleys are available, giving 16 spindle speeds. The base contains oil sump for wet drilling.

Feeds are .003, 005, .007 and .010. Taper hole in spindle, No. 4 Morse.

Capacity with back gear is 1½" in cast iron. Without back gear, 1". Spindle travel with power feed is 9¼". Smallest distance between spindle and gib is 10½". Working surface of table is 24"x119". Maximum distance between spindle and table is 22". Vertical travel of table is 11". Distance between centers is 19". Total height with spindle up to 104". Height of base 10". Overall dimensions of base are 54" x135". Net weight is 12,000 lbs. *It will pay you to investigate this efficient, modern unit today.*

## CANEDY-OTTO MFG. CO.

**CHICAGO HEIGHTS, ILLINOIS**

head shaft (table down) 38" Ball bearing heavy duty casters, rubber cushioned. Shipping weight 450 lbs.

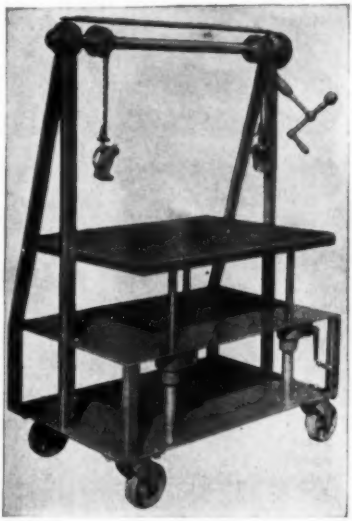
B-2 handles dies up to 32" long. Overall length, 36" Overall width, 24" Overall height, 66" Table maximum height from floor 40" Table minimum height from floor 24" Safe load, table, 2000 lbs. Safe load, overhead, 1600 lbs. Shipping weight is 375 lbs.

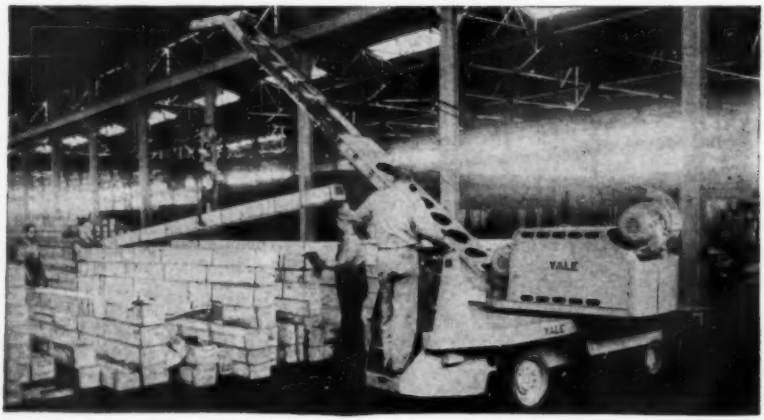
## The "Whirly"

Another and different type of handling equipment that stands in the front rank in point of all-around usefulness is the Utility service truck, Model "K42S-6-7-78", manufactured by The Yale & Towne Mfg. Co., Philadelphia.

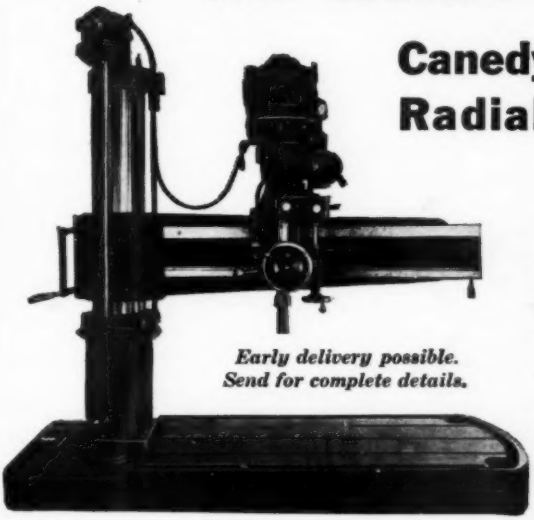
Powered by giant electric batteries it is mounted on a platform equipped with rubber tired wheels, and has a 78" wheelbase which allows an extremely short turning radius. The boom has a reach of 19 feet, can be swung in an arc of approximately 300 degrees, and has a lifting capacity of 6000 pounds of a 7 foot outreach.

One of the men watching it work for the first time at the Ducommun Metals & Supply Co., Los Angeles aptly christened it "The Whirly". As it comes up the aisles with a length of 12" pipe swinging from the boom and swaying from side to side, it resembles exactly the gait of a bull elephant carrying a tent pole and swinging his massive head as he plods through the dust of a circus lot. Like that cunning beast who has no peer from a materials handling standpoint in the animal world, the "whirly" has power and diversified usefulness.





# The Latest



## Canedy-Otto Radial Drill

*Early delivery possible.*
*Send for complete details.*

We invite you to send for complete information regarding these and our many other models of drills and radial drills. For years, Canedy - Otto has been the manufacturer of first-class, high grade drilling units. Single spindle, multiple spindle, and radial drills. We can help you solve your production problems. Do not delay. Write today.

## SPECIFICATIONS:

| | 9" Column 3' Arm | 11" Column 4' Arm | 11" Column 5' Arm |
|---|---|---|---|
| Drills to the center of circle on base or table | 73½" | 96" | 120" |
| Length of arm | 3' | 4' | 5' |
| Greatest distance from spindle to base | 43½" | 48" | 46" |
| Minimum distance from spindle to base | 5½" | 15" | 17" |
| Minimum distance from spindle to column | 10½" | 10" | 10" |
| Traverse of spindle | 9½" | 9½" | 9½" |
| Hole in spindle—More Taper | No. 4 | No. 4 | No. 4 |
| Diameter of spindle at nose | 2½" | 2½" | 2½" |
| Traverse of head on arm | 25½" | 36½" | 48½" |
| Traverse of arm on column | 21½" | 24" | 22" |
| Spindle speeds with 1200 RPM motor | (60, 85, 130, 180, (425, 560, 860, (1200 RPM | | on all models |
| Spindle speeds with 1800 RPM motor | (85, 130, 180, 274, (560, 860, 1160, (1750 RPM | | on all models |
| Feeds per revolution of spindle | (.004" .007" (.010" .020" | | on all models |
| Bearing of arm on column | 14" | 16" | 18" |
| Size of main driving motor | 2 HP. | 2 HP. | 2 HP. |
| Height of drill column over gears | 89" | 98" | 98" |
| Working Surface of Base | 29"x45" | 36"x60" | 36"x88" |
| Net weight | 4000 lbs. | 6200 lbs. | 7000 lbs. |

# CANEDY-OTTO MFG. CO.

## CHICAGO HEIGHTS, ILLINOIS

(Pronounced COLE'-MON-OY)

**CERTAINLY YOU CAN CAST IT!**

There are many cases where solid castings of COLMONOY are highly desirable such as centerless grinder rests, saw guides, seal rings, valve seats and many other small parts.

COLMONOY may be also be cast-on, saving a great deal of time where several duplicate parts are hard-faced at one time. Casting results in a smoother surface than welding, and with a metal as hard as COLMONOY, the saving in machining is important. Send us your blue-prints for quotation.

CATALOG ON REQUEST.

**WALL-COLMONOY CORP.**

Sixth Floor, Buhl Bldg., Detroit, Mich.

NEW YORK 550 W. 54th St.
TULSA 209 Midco Bldg.
BUFFALO 3155 Seneca St.
WHITTIER, CALIF. 123 W. Philadelphia St.
CHICAGO 2054 W. Harrison St.

**COLMONOY**

Hard Surfacing Alloys and Overlay Metals

With the old method of loading by the use of ropes and skids, there was a high percentage of accidents, such as crushed hands, wrenched backs, and foot injuries. The "whirly" has reduced the accident percentage to the absolute minimum. Its simplicity of construction and ease of operation permits the operator and his helper to remain out of the danger zone when a lift is being made. Its mobility is the chief factor in its efficiency.

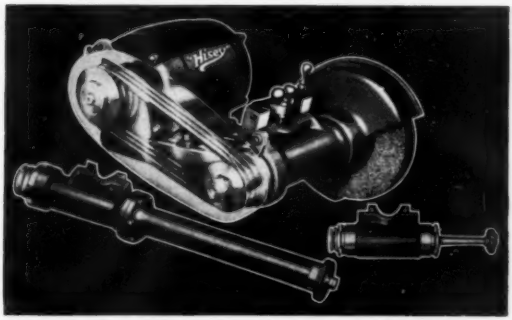
## Roll Out the Barrel

Steel barrels — low-priced because they're low in production cost; low in production cost because of intelligent use of materials handling equipment. For examples of what this means, let's visit the Chicago branch of Rheem Mfg. Co., Inc.

Example 1:—Years ago it was necessary to keep receiving, storing and manufacturing rooms near each other because men carried, or transported on non-automatic trucks, the bundles of sheet steel from one of these to the other. They could handle but eight or 10 sheets at a time and used to have to be called off the line to help handle a load.

Today a powerful little Yale Ready-Power Lift Truck runs right into the box cars, slips its forks under a bundle or so of sheet steel and runs back and forth between the loading platform and store room with loads of around two tons. It can carry three if necessary. It can pass through a four-foot wide space, turn a very sharp corner, lift its load over obstructions up to seven feet high. A Plymouth motor drives both motive and lifting machinery, and the truck carries its own generators, although it's gasoline powered. In 2½ years the factory has had no occasion to repair the truck.

This gave the factory considerable leeway in utilizing space better suited by nature, if not by location, for receiving, storing and manufacturing. Dies, heavy machinery and other major moving jobs are also handled by the useful little truck. And production was speeded up considerably. The men can stick to their jobs and do not drop work to handle loads.



*HISEY 3 H. P. Grinder set up for external grinding. The Internal grinding heads are interchangeable with the external head on machine.*

# You *CAN* Grind It!!

The Defense Program has presented many manufacturers with grinding problems. No matter how well equipped a grinding department may be, a job will turn up which cannot be handled with the regular equipment. This is where HISEY Wide Range Precision Grinders step into the picture. Mounted on lathes, boring mills, planers, etc., they will do any internal, external or surface grinding operation. They are built for tool room accuracy with ruggedness and power for continuous production work. Size range from ½ to 10 H. P. capacity in a number of different models.

*WRITE FOR BULLETIN NO. 51B*

## THE HISEY-WOLF MACHINE CO.

**CINCINNATI, OHIO**

BE
PREPARED

AMERICAN industry is entering upon a great program of national defense. Thousands of new workers must be trained in every field, workers who will be the very foundation of this tremendous industrial expansion. Conserve this important man-power by providing the maximum in safety for their eyes and face.

INSIST ON SELLSTROM
THERE IS NO BETTER.

*Our catalog is full of valuable information for your safety program and shows our complete line. Write for your copy TODAY.*

SELLSTROM
MANUFACTURING CO.
646 N. Aberdeen St. Chicago, Illinois

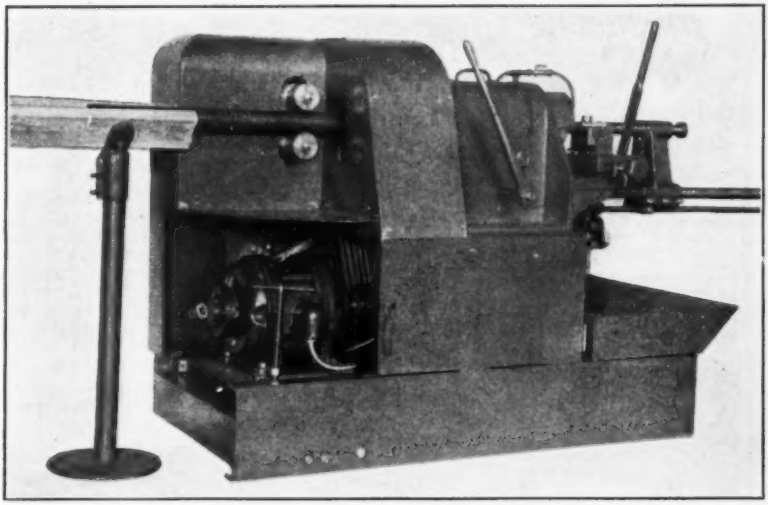
Supplementing the little lift truck are a number of Barrett-Cravens platform trucks which are used to store loads soon-to-be-used near the machines and to move metal short distances.

Example 2:—The loading platform is big, capable of handling at least five cars comfortably. But a single place for receiving and a single place for shipping have been found to be better for efficiency and accurate records, so cars are loaded or unloaded from a single car position. This is accomplished without having an engine around all the time. An automatic winder reels in cable and pulls unloaded cars up out of the way or moves loaded ones up to their proper position. Factory engineers built this themselves.

Example 3:—The galvanizing room is large and heavy materials are handled in it. Rather than employ hand dipping operations or the old crane method, three electric hoists mounted on monorails and equipped with cranes are moved almost at will over the tanks and to pick-up pieces. Harnischfeger takes the bow on these.

Example 4:—Mathews conveyor systems are installed in the entire finishing section and some of the manufacturing sections of the plant. Many hundreds of feet of various types of conveyor systems are used. One is an endless belt conveyor system which carries the assembled barrels to the upper platform in which they are finished. This makes the use of the upper platform considerably more practicable than it would have been otherwise, saving floor space, and keeps it from being overcrowded at any one time. The endless belt runs through two ovens, 270 and 200 feet in length. In one, the outer coatings of paint are dried. On the other, the inner coatings of such materials as sanitary lacquers of the types used for food products (such as lard) are dried. And simultaneously with the finishing of the barrels, lids are run through the ovens on parallel belts and given essentially the same treatment. Because of the danger of the liquid finishing material concentrating at one

# THE MODERN CUTTING-OFF MACHINE



## 1000 PIECES PER HOUR—

—of 9/16" O.D. tube, with 1/8" wall, cut into 18" lengths. For this type of work the hand operated machine is faster than an automatic.

The Modern Cutting-off Machine is of rugged construction, engineered for heavy duty service and long life. Anti-friction bearings insure low maintenance and operating costs.

Three models are available, handling stock up to 4 5/8" O.D.

*WRITE OR WIRE FOR DETAILS*

**MODERN MACHINE TOOL CO., JACKSON, MICHIGAN**

"WE'VE GOT TO TRIM THESE STAMPINGS IN A HURRY!"

"RIGHT! BUT WE CAN'T SACRIFICE ACCURACY FOR SPEED!"

**Quickwork Stamping Trimmers Give Both Speed and Accuracy**

*Where speed is a necessity, where accuracy counts, where the job is unusually tough*—that's where you'll find QUICKWORK Stamping Trimmers and Forming Machines operating at the greatest profit.

For Quickwork Stamping Trimmers, because of their exclusive design, provide you—in a single machine—with an economical method of *trimming, beading, flanging and forming* both large and small stampings. With Quickwork you secure production at a speed comparable to that of a press—yet with the smooth, clean cutting action of a rotary shear. Expensive presses and dies are often eliminated.

● This Quickwork Stamping Trimmer and Forming Machine can be equipped with electric eye control to stop and unclamp stamping at completion of cut. Cutting speeds range from 10 to 60 feet a minute.

● Quickwork hand lever controlled table type machine trimming sink castings. An economical machine for varied production—in some instances can both cut and flange stamping at a single operation.

● Shipment of many standard Quickwork Models is possible from stock—subject to prior sale. Write, wire or phone Quickwork-Whiting Division of Whiting Corporation, Harvey, Illinois, for complete information and engineering details.

WHITING CORPORATION
HARVEY, ILLINOIS

QUICKWORK

part of the side of the barrel, the barrels are pushed through the ovens by flanges which keep them rolling over the immovable base of the oven.

A truck running over inked stencils mounted in the floor, labels the barrels, which are then fitted with tops and banded before going down a roller conveyor system (downhill) to the shipping section of the plant.

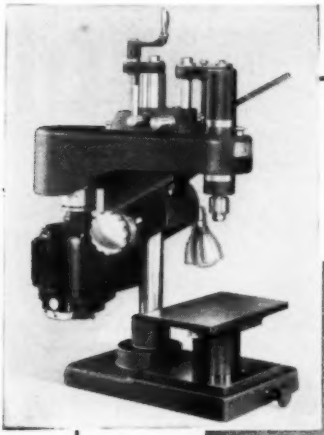
It's production that gains efficiency from materials handling equipment that keeps steel barrel prices low!

## Around the Corner

We've long encountered cranes that are mounted on straight-line rails for straight-line materials handling. And we've even found numerous ones mounted so that they may be shifted from a rail traveling in one direction to another rail running at right angles to the original by the pulling of a jack or lowering lever. But it remained for M. Block & Son, Chicago manufacturer of metal specialties, to install rails that carry the crane around a curve.

This is an installation by the Chicago Tramrail Co. in which odd-shaped basement space was to be employed for a store room, receiving room and some few manufacturing operations. Because of the shape of the room, it was impracticable for an ordinary straight-line rail to be used in carrying the sheet metal from where it first was brought into the plant to store room, elevators and the machines. And to obtain further space for the operations was difficult and expensive. So experts from the installing company conceived of bending the rail around the curve on a wide radius so that all the space could be utilized and the expense of extra rails for transporting the crane was sidestepped.

Experts who have examined the novel installation have said that by slightly modifying the type of rail curvature, it would be possible for the metal to be carried around a rather sharp right-angle turn. This would permit utilization of "L"-shaped factory space for



# DRILLING AND TAPPING

Range of speed, sensitivity, ease of operation and all-around performance characterize the NEW "Varimatic" Super Sensitive Drilling Machine. (Upper Left)

The Hamilton-Muehlmatt Tapping Machine offers high quality of work, speedily obtained through easy, smooth operation, with freedom from tap breakage.

In the field of production small hole drilling and tapping, these efficient modern units meet every requirement.

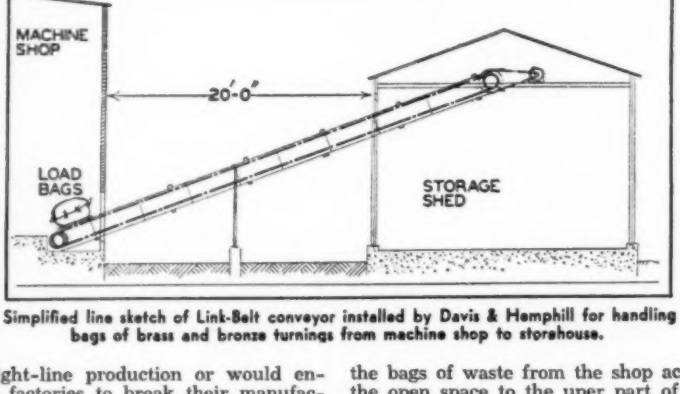
The NEW "Varimatic" Sensitive Drilling machine provides spindle speeds ranging from 840 to 9300 r. p. m. through a Variable Speed Drive and two-speed pulleys. Graduated dial indicates spindle speeds. Drilling capacity is .004" to 5/16" in all drillable materials.

The Hamilton-Muehlmatt Sensitive Tapping Machine handles everything from the smallest and finest tap up to 10/32 inclusive. Spindle tapping speeds are from 1200-2600 r.p.m.

***May we send bulletins fully describing both units.***

## THE HAMILTON TOOL CO.

**B AND WAYNE STS, HAMILTON, OHIO**




**Simplified line sketch of Link-Belt conveyor installed by Davis & Hemphill for handling bags of brass and bronze turnings from machine shop to storehouse.**

traight-line production or would enble factories to break their manufacuring operations from space-absorbing traight line production to a circuar or square arrangement of the sucessive manufacturing operations, keepng the work on any one piece of nanufacturing concentrated in one part f the room. Nor would it require the onveyor line that takes up floor space o accomplish this.

## Handling Turnings

Davis & Hemphill, of Elkridge, Md., as a machine shop equipped with crew machines which produce a conderable amount of waste in the form f brass and bronze turnings. For disosal, they installed a simple and inxpensive conveyor system. Before installation of the conveyor, it was the ustom to permit quantities of waste to ccumulate in the shop, then bag it and wheel the bags manually to the storehouse, a separate building about 20 feet, cross an open space from the shop.

This system had some disadvantages n that accumulations of waste occupied onsiderable valuable space which was ardly in accordance with the best rinciples of good housekeeping, and he manual transportation of the turnngs caused considerable confusion. Consequently it was decided to install conveyor from just inside the machine hop to the storage shed. This carries the bags of waste from the shop across the open space to the uper part of the shed and drops them off, as shown. The bags weigh from 125 to 250 lbs. and about one bag per hour is transported by the conveyor. Before bagging, the turnings are put through a centrifugal extractor to recover the cutting fluid. The bags are kept in the storehouse for shipment in carload lots when the market for scrap is favorable.

The conveyor was made by Link-Belt, Co., and consists of a single strand of Ewart detachable chain. Eight wooden slats have been attached to eight consecutive pitches of the chain, forming a platform of sufficient size to carry a bag. Wooden bars spaced 6 feet apart over the balance of the length of the chain are supported on steel tracks. The conveyor is driven by a 1 h.p., Link-Belt motorized speed reducer and Silverlink roller chain, the drive being installed on the lower chord of the storehouse roof truss where the upper end of the conveyor terminates. The rest of the conveyor is supported by a structural steel frame, one end being at the roof truss and the other end at the wall and floor of the machine shop. There is also a support in the middle of the 20 foot open space.

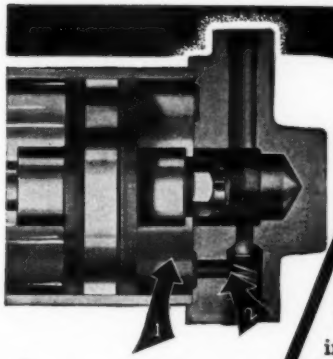
When a bag of turnings has been placed on the platform of the conveyor, the operator starts it by pressing a push button which causes the

# NOPAK *Self-Regulating*

## CUSHIONED AIR CYLINDERS

### *Meet Most Operating Requirements*

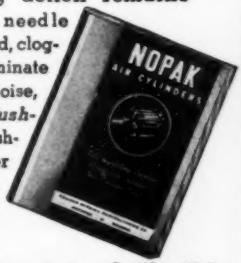
***Provide desirable features of Constant Cushioning with Smooth Gradual Action.***



1. Built-in, Self-Regulating Air Cushion.

2. Quick-opening Air Duct assures quick starting under full power.

● Since their introduction late in 1939, industry has found more uses for the new NOPAK Air Cylinders with Self-Regulating Air Cushion than for the two earlier types combined. Here are a few reasons why: 1. The smooth, gradual, predetermined cushioning action remains constant. 2. There is no needle valve to be frequently re-adjusted, clog-up, or get out of order. 3. Eliminate damaging metal-to-metal impact, noise, shock and vibration. 4. They place *Cushioned* Air Cylinders in the non-cushioned price range. 5. Prolong cylinder life—cut maintenance costs way down. You, too, may find that this new type cylinder will fulfill most of your needs.



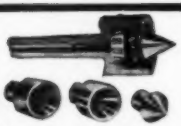

**GALLAND-HENNING MFG. CO.**
*2754 S. 31st Street • Milwaukee, Wisconsin*

**Consider All 3 Types — they're fully described and illustrated in Bulletin 77. If you haven't a copy, send for it.**

**NOPAK VALVES and CYLINDERS**
**DESIGNED for AIR or HYDRAULIC SERVICE**

AVOID
PRODUCTION DELAYS

IDEAL
Live Centers



NEW

* Interchangeable Inserts Permit Use With All Kinds of Centered and Uncentered Work.
* Work with heavier load at higher speeds.
* Save man hours on centering work.

* Save cost of fast-wearing dead centers
* Make work easy—increase production.

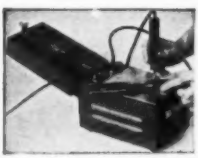
IDEAL BALANCING WAYS

10" Swing
20" Swing
42" Swing
60" Swing

* Simplify balancing crankshafts, pulleys, flywheels, etc.
* No leveling or set-up required.
* Work carried on free-turning, special steel discs.

* Precision ball bearings.
* Adjustable for different length work.

IDEAL
"Universal" Electric METAL ETCHER



* Permanently marks on steel, iron and their alloys.
* Compact, everything enclosed.
* Four etching heats. * Renewable work plate.
* Ground clamp for large work.
THREE Other Models Also Available.

IDEAL
ELECTRIC MARKER

* Permanently marks on all materials.
* Used like a pencil.
* 7200 cutting strokes per min.

* Special Alloy or Diamond Cutting Point.

*Ask For Free Demonstration*

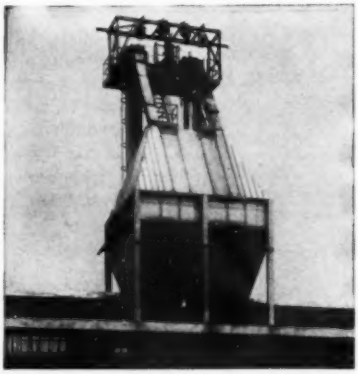
**Ideal Commutator Dresser Co.**
1441 PARK AVE., SYCAMORE, ILLINOIS
*"Sales Offices In Principal Cities"*
In Canada: Irving Smith, Ltd., Montreal, Que.


platform to ascend to the top of the conveyor where bag is automatically discharged through a chute into the storehouse. The conveyor then automatically returns the platform to the loading point in the shop where it is automatically stopped by contacting a hatchway limit switch, and is ready for the next bag. The conveyor will not start again until an operator presses the push button control.

The first cost of a simple conveyor such as this is low and the savings are large in proportion, so that it soon pays for itself. The installation is of particular interest because the use of conveyors of this type is comparatively unusual in machine shops, and the inference is that this may suggest other possibilities where important savings may be realized.

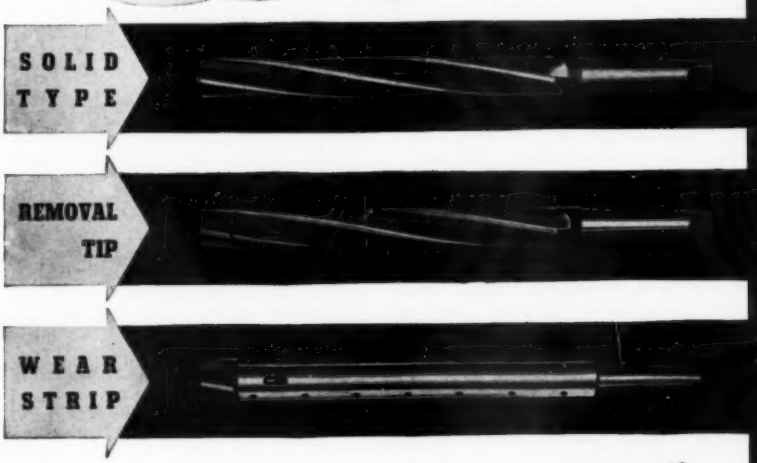
## Vibrators Prevent Arching

A common trouble in handling bulk materials is arching or packing at the outlets. In this particular case, the problem involved handling of iron chips which formed a closely packed mass at the outlets, after falling from the elevator down the chutes and into the 150-ton bins. The chips have a

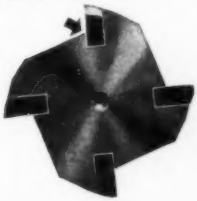


natural tendency to rust to each other and to the sides of the bins and required the labor of three men, poking and sledging for several hours to remove the contents of the bins. This

# Stellite Core Drills




THE SCULLY-JONES BRAZING PROCESS INSURES UNIFORMITY



These new inserted blade core drills were designed in conjunction with the Haynes-Stellite Company to make possible for you to save one-half the time at one-third the cost.

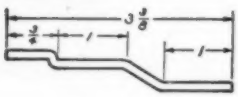
For further details send your blue prints or requirements to our Engineering Dept.

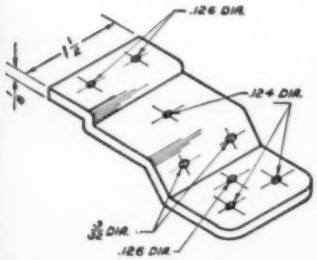
**SCULLY-JONES & COMPANY**

1901 SOUTH ROCKWELL STREET · CHICAGO, ILLINOIS

Punch

**don't drill small holes**






**Pierced After Forming, With Durable Patent Piercing Punches**

Why go to the expense of developing a formed blank for proper hole locations when by using Durable Patent Piercing Punches this can be eliminated by piercing after forming, thus assuring perfect center to center hole locations, regardless of stock temper or forming distortion?

Piercing after forming also eliminates possible hole distortion, or flattening of burrs which might necessitate a reaming or burring operation.

The Durable Punch, which operates with less than normal clearance, punches a straight hole, free from burrs and makes possible the punching of holes on sloping faces as shown on the above piece.

Reduced maintenance costs alone justify their use on substantial runs regardless of stock thickness.

Consult us about your piercing problems.

Write today for free handbook showing construction of many typical dies used by industrial leaders.

**DURABLE PUNCH & DIE CO.**
**2240 Ogden Ave., Chicago, Ill.**
EASTERN OFFICE
**1257 Commercial Trust Bldg., Philadelphia, Pa.**

was an accident hazard as the bin outlet was 25 feet above the track level.

To remedy the condition, Model V-125 Syntron electric vibrators were installed. These are made by the Syntron Co., Homer City, Pa. A vibrator was attached to the pitched surfaces of the bins, inside the rectangular opening behind the railing. Another was installed on the opposite pitched surface of the bin, directly above the outlet to the discharge chute. The two vibrators effect a continuous free flow of chips from the bin during the car-loading operation.

While this is one of the first applications to the handling of iron chips, vibrators are widely used in the handling of coal and other materials.

**Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS**

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

*Write for Circular*
**NIELSEN TOOL & DIE COMPANY**
1859 Gardner Ave.
Berkley, Mich.

# HALCO
# UNIVERSAL HEAD

FOR **HIGH SPEED** MILLING, DRILLING, BORING AND COUNTER BORING ON ANY ANGLE

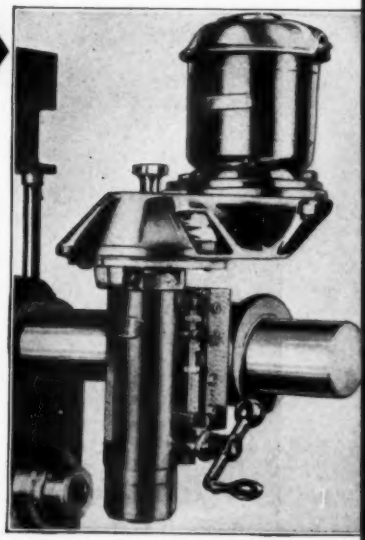
## SPEED • ACCURACY • DEPENDABILITY

The Halco Hi-Speed Universal Milling attachment is designed to meet the demand for greater efficiency, better workmanship, and for speed in building tools, dies, jigs, fixtures, wood and metal patterns, and other machine products where accurate and fast machining are of prime importance.

With its 4 inch vertical travel, many drilling, milling, boring and facing operations can be accomplished in one setup. The total weight is approximately 90 pounds, and it can be easily mounted by one man.

The Halco Head is engineered and built to precision limits in a modern shop by skilled mechanics. All parts and materials built into this machine are the very best obtainable and unconditionally guaranteed for six months.

Motor of heavy duty type, ½ H. P., 110 volts, 60 cycle, General Electric ball bearing with plug in cord and switch. Easily reversible for L. H. cutters. Speeds 500 to 2,900 R. P. M. or 350 to 2,400 R. P. M. Also eight speeds 200 to 2,900 R. P. M. available at extra cost.



**PRICE $195.00**

**With 10 Speed Back Gear**

**$47.50 Extra**

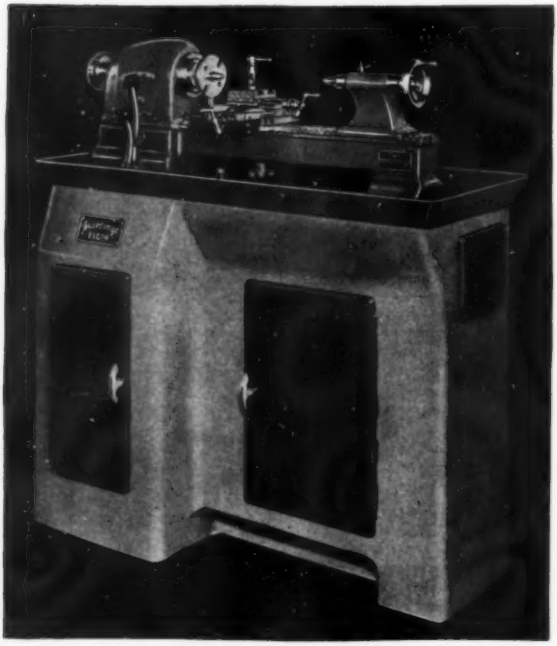
Sold direct, factory to you, or your nearest dealer. Many machines in use. Tried and tested in machine plants for 1-1/2 years. Each head is unconditionally guaranteed for six months.

***Write for folder giving details or order now for quick delivery.***

## HALCO PRODUCTS CO.

**14230 BIRWOOD AVE., DETROIT, MICHIGAN**

# Elgin



*Precision*

## BENCH LATHES

**ELGIN TOOL WORKS**

Division Of HARDINGE MANUFACTURING CO.

1772 BERTEAU AT RAVENSWOOD AVE. — CHICAGO, ILL.

# Psychology of Environment

By HERMAN E. HENKE

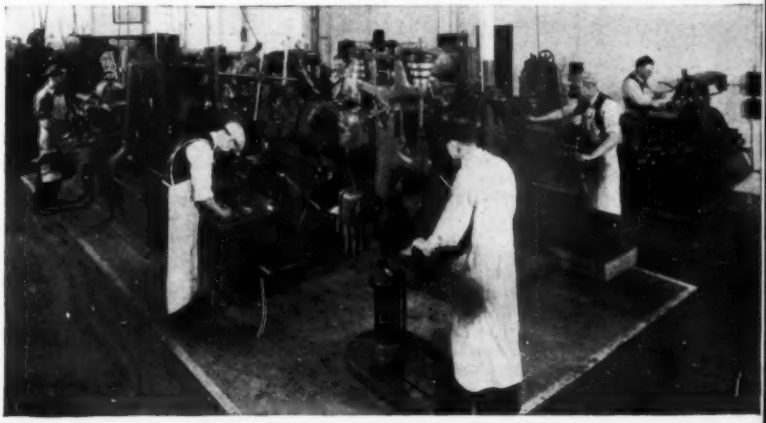
"AS a man thinketh in his heart so is he!" And his thoughts are the result of his environment!

The job you have, the car you drive, the home you live in, the husband or wife you have are all the direct result of the mental picture you have established in your mind . . . So says science . . .

Science also tells us that the events of our lives are largely the result of our thoughts. For example — if we think thoughts of weakness, thoughts of ill health, we acquire the condition known as sickness. If we think thoughts of failure, discouragement or poverty, we attract the condition we have mentally created.

On the other hand, if we think thoughts of strength, health, vitality, the whole world takes on a rosy hue; we become healthy . . . Success attends our every act and we attract to us the better things of life.

Business men have come to know these truths. Many of them apply these principles without defining them as fundamental principles . . . often without even knowing the reason why their business efforts have been successful . . . and since we know and understand these recognized laws of life, scientists have carried the thought further, reaching down to man's very emotions to find that we are all basically creatures of our environment. This is a natural law . . . inviolate . . . just as positive as the law of gravitation. It applies to everything and everybody and no one can change it.



Clean, cheerful, well-lighted working surroundings encourage the men to do their best.

A neat, orderly assembly floor is a long step toward elimination of errors and accidents.

Applying the law to any business, we find that the workman, housed in an atmosphere of disorder and uncleanliness, soon acquires a mental attitude which reflects his surroundings. His work becomes careless and slovenly and if he is a true craftsman, one of two things happens. Either he becomes dissatisfied with himself as a workman and seeks new employment, or he disintegrates into mediocrity. Unsightly, uncomfortable, dingy, drab surroundings form the beginning of a vicious circle which penetrates deeply into the soul of man.

**The Eyes Have It**

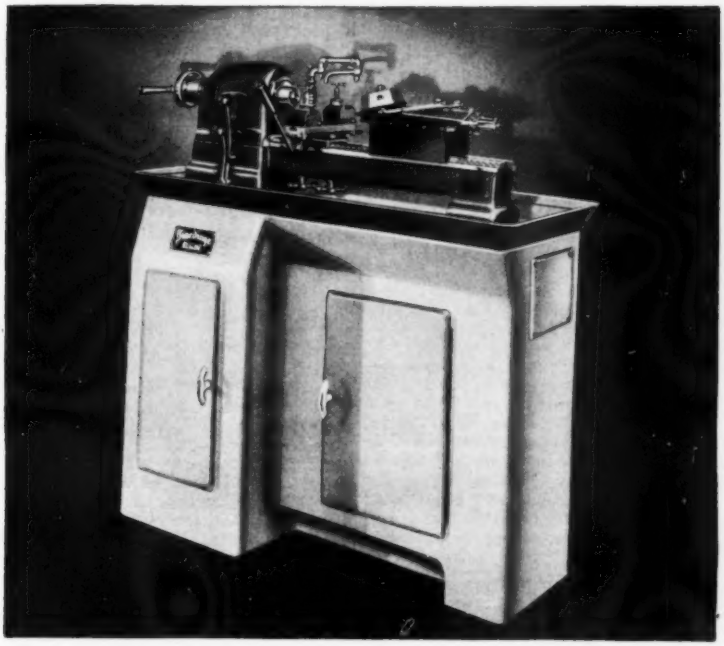
Science has further discovered that man is influenced to a greater extent through the eyes (87%) than through the ears, which again bears out the logic of these conclusions . . . that visual impressions are most important.

Executives who have recognized these principles and provided better working conditions for their employees have found benefits and advantages reaching far into their business. Not the least of these is an improvement in their products which in turn increases salability and in many cases permits an increase in prices. The result is, full repayment with good measure for their investments.

On the other hand, the employer who fails to consider the importance of environment and permits untenable working conditions to prevail, is likely to find himself confronted with labor difficulties, a much too frequent turnover of man-power, and the quality of his product may suffer or fail to reach standard, resulting in a subsequent loss of sales or profits, or both.

It is but a few steps into the past when industrial enterprises gave little or no attention to such theories. Factories were considered in terms of floor space. Thoughts of architecture never even entered the picture. An industrial contractor was called in . . . a rough layout was made . . . four walls and a roof followed. Just another factory. Factory sites were selected in the poorer sections, usually the outlying districts where land was cheap, or possibly because of zoning restric-

# Elgin



## *Precision*
## HAND SCREW MACHINES

**ELGIN TOOL WORKS**
Division Of HARDINGE MANUFACTURING CO.
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tions which barred factories from the better sections of the city. Many cities still legislate and restrict business establishments from certain areas. Happily, however, most cities have recently relinquished their rigid restrictions and prejudices against industrial buildings, and one may find examples of business establishments which actually have enhanced adjacent property values because of their attractive modernistic architecture.

Such an example is the plant of the American Electric Fusion Corp., 2610 Diversey Ave., Chicago, Ill. Here indeed is a pointed object lesson of the subject under consideration.

While the motivating objective of the new plant was the need for additional space, the philosophy outlined in this article was considered in every detail.

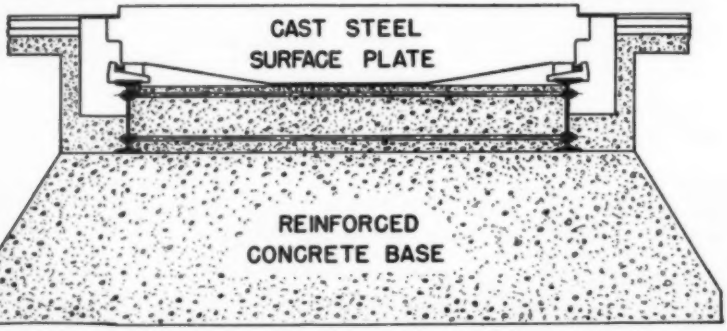
Located in a modest residential district, property values in the adjacent areas have increased perceptably due to the attractive modern architecture of the new structure . . . and "strange as it seems" a clean-up crusade has gripped the good neighbors of the entire community in order that their properties might measure up to the example set by the new, modern "factory."

Approaching the A. E. F. plant, the visitor is impressed by its air of streamline modernity and this impression suffers no "let down" upon entering the premises, nor has architectural design been permitted to dominate all the company's business requirements. On the contrary, once in the lobby, the visitor finds himself in an environment which bespeaks the company's business. A large panelled mural (painted by Karl Kelpe) pictures the history of the welding industry from its inception to the present day. Beginning with the old time blacksmith, the mural carries the visitor through the important stages of development of the industry.

Briefly, every visitor receives a thorough build-up" on the welding industry from the moment he enters the premises . . . no doubt exists in his mind as to the nature of the company's business.

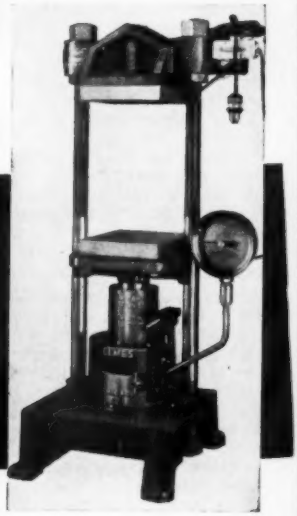
The science of heating and ventilating, which tells us that a man works at his highest point of efficiency at a temperature ranging between 67° and 70° has had careful consideration in this project. To meet this requirement the plant is entirely air conditioned. An even temperature maintains working conditions at peak efficiency. It has been their experience that during the excessively hot Summer periods, the comfort of the air conditioned factory actually makes the men glad to "come to work."

Scientifically lighted, during daylight hours through glass block, at night with fluorescent and mercury vapor fixtures, accidents are at a minimum and workmen are capable of full production re-




Details of the surface floor plate construction which helps to assure accuracy in assembly.

# Plan Production Profits *with an* ELMES HYDRAULIC LABORATORY PRESS



## ADVANTAGES

**1** Adapted to Test and Experimental Runs as well as Small Batch Production. Can be used for a great variety of applications.

**2** Entirely Self-Contained.

**3** Maintains constant pressure against a dead head for long periods of time by means of improved new Valve with special packing.

**Trustworthy performance details for production guidance are easily and economically obtained on a small scale with this Elmes Hydraulic Laboratory Press.**

**The unit is saving time and needless repetition of tests in many leading laboratories where it has proved to give reliable results and ease of operation, in accordance with the high standards set by Elmes Presses of larger capacity.**

**Find out from Elmes how this versatile Laboratory Press can contribute to your experimental and production progress—at small cost. Facts and figures are yours for the asking without obligation.**

**Also Manufactured in Canada**
**Williams & Wilson, Ltd., Distributors**

CHARLES F. **ELMES** ENGINEERING WORKS

244 N. MORGAN ST. *Chicago* . . . SINCE 1851 . . .

gardless of outside conditions.

It is interesting to note that a certain nationally known concern reduced its accident costs from 44c per unit to 13c by installing adequate lighting. Considering the matter from a dollars and cents viewpoint, the cost of this improvement more than paid for itself in less than six months.

The workman under such surroundings is a contented man. He does a better day's work. His employer is rewarded in a tangible way, in that each workman's mental and physical condition is reflected in the product of the company.

## Reduces Labor Turnover

Workmen of the higher type are attracted to employment in such concerns and the tendency to "change jobs" is conspicuous by its absence. And when it is considered that the cost of training men is approximately $900 per man, it becomes evident immediately that by providing better working conditions, the turn-over in man-power is reduced to a minimum, resulting in a subsequent saving for the employer.

The cleanliness and orderliness which prevail throughout the plant are so pronounced that slip-shod employees feel "out of step" and soon eliminate themselves.

The benefits and advantages which accrue to the employer who provides agreeable and tolerable working conditions are far reaching—many are hidden, except on the company's balance sheets.

Other more or less hidden benefits are felt in that the company enjoys lower insurance rates, a minimum of accidents, lower compensation costs and improved efficiency in all departments of the business.

Of particular interest is the assembly room with its surface-plate floor, designed for precision assembly of the company's principal product, A. E. F. Tube Mills.

Perfect alignment, so necessary in this equipment. is assured without shimming. It is estimated that the saving of time, due to ease of alignment, will be a considerable item per machine.

The floor is believed to be the only one of its kind in the entire middlewest. It is 64 x 8 ft. and made up of 16 ft. plates 4' x 8' each. Six feet of reinforced concrete forms the base into which are embedded two 15" 1 Beams, 65 ft. long. Each plate (14" cast steel) can be set to exact level by means of four jacks which ride on the I Beams.

In addition to the new structure, the entire former plant has been remodeled and modernized with air conditioning, fluorescent lighting, and glass block.

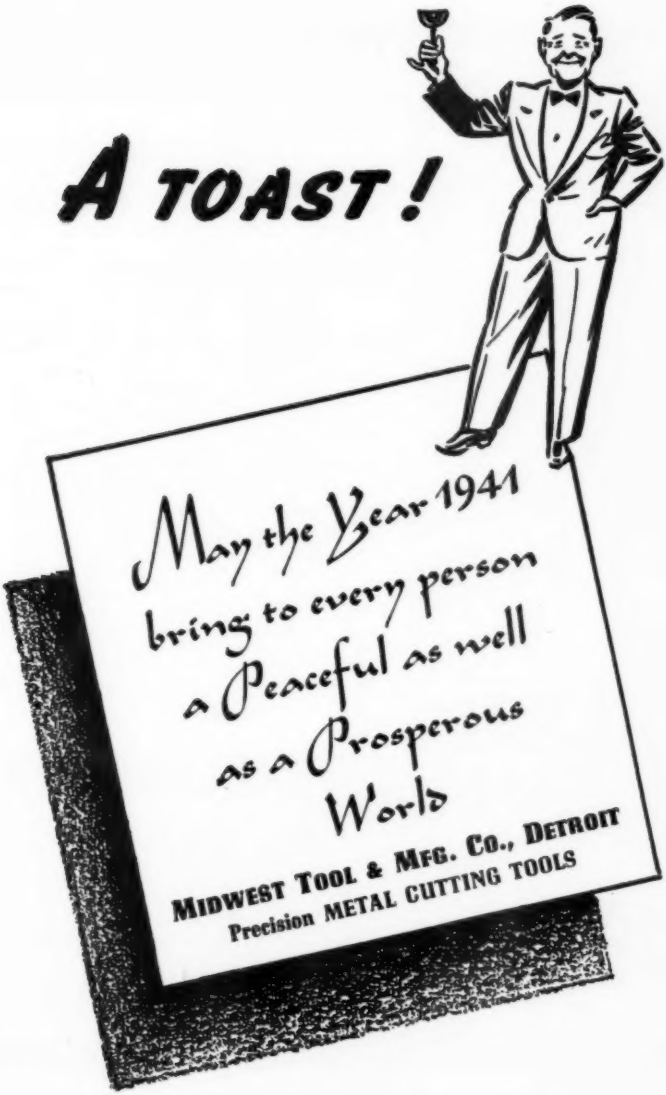
Modern plants, by the grapevine of contributing factors create additional value in products. Value in products creates buyers. Better value in goods is greatly facilitated by better plants. The whole matter is a cycle of logic.

Industry is ever on the alert for profits—some say, cut down costs—others attempt to drive the men harder. We see today's present modern factories—we also still see sweat shops where men and women curse every hour they spend in them—where they "watch the clock" — where a day's work means nothing more than a pay envelope—what industry needs to increase efficiency is, a little more humane thought on the subject of environment.

## Better Environment, Better Products

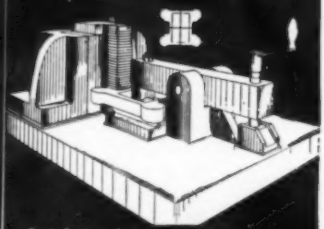
T. J. Henke, President, when asked why he built such an imposing plant for the manufacture of machinery, says: — "In my opinion, a machinery manufacturing plant has as much reason for providing a clean, healthful, orderly environment for its workmen as our banks, offices, etc. After all, we are dealing with men who possess every faculty of their office-working brothers, minus the white collars."

Getting back to the theme:—if you want the utmost efficiency from your employees, consider the Psychology of Environment. Improve the conditions under which your men must work. Shape their thoughts by improving their environment, and in so doing, you, the employer will reap a succession of benefits which will reach away down into the vitals of your business . . . your purse.


A TOAST!
May the Year 1941
bring to every person
a Peaceful as well
as a Prosperous
World
MIDWEST TOOL & MFG. CO., DETROIT
Precision METAL CUTTING TOOLS

# BROACHING PAYS

Part: Shackle bolt
Material: Machined steel
Operation: Broach ½ round, 2 at a time
Production: 160 per hr
*(Former rate by milling: 50 per hr)*



Part: Spring chair
Material: Rough malleable casting
Operation: 1. Broach slot sides
2. Broach slot opposite sides
Production: 60 pcs. per hr
*(Former rate by milling: 15 per hr)*

## . . . ONE BROACHING PRESS with 7 different FIXTURES processes 7 different PARTS in 60 different SIZES

Job-lot processing by broaching *is* profitable. Both initial cost of equipment and cost of processing can be reduced compared with milling—with the added advantage of increased productive speed, so important these days when productive facilities are heavily taxed.

In one well known plant, a single Colonial Utility type Press of 15 ton capacity and 36 inch stroke has supplanted milling machines for processing—

(1) Seven different trailer parts, in

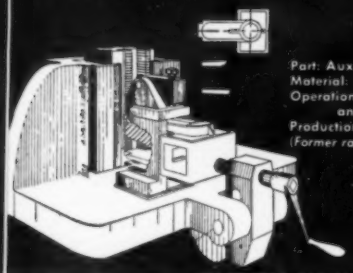
(2) Sixty various sizes, in

(3) Job lots usually ranging from 300 to 1000 parts, at

(4) One-fourth the previous processing cost per piece, and

(5) With an initial equipment cost of one-fourth of former milling machines including the necessary fixtures, at

(6) *Three to four times the former productive rate per hour, including change-over time.*



Part: Auxiliary spring chair
Material: Rough malleable casting
Operation: Broach both sides upper and lower arms in one pass
Production: 45 per hr
*(Former rate by milling: 14 per hr)*

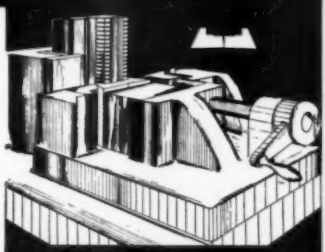
**COLONIAL BROACH COMPANY**

147 JOS. CAMPAU
DETROIT, U. S. A.

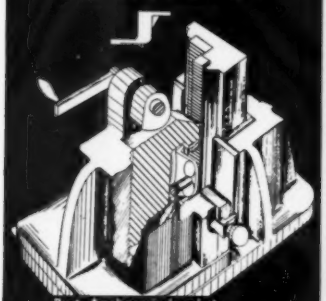
# FOR JOB-LOTS TOO

**Yes, broaching machines are both high-production and flexible job-lot tools. For different parts, only the fixtures need be changed. The design of the platens, columns, beds are such that quick replacements can be made,—insuring minimum set-up time.**

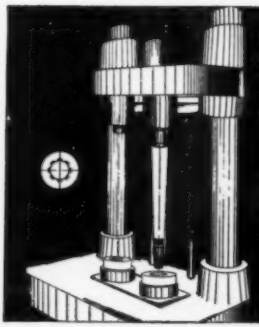
**When small lots in a variety of forms or sizes must be processed quickly and inexpensively, Colonials with the right fixtures are proving the answer. Colonial has a corps of engineers at your service, and welcomes the opportunity of applying their specialized knowledge of job-lot production problems to your machining requirements.**



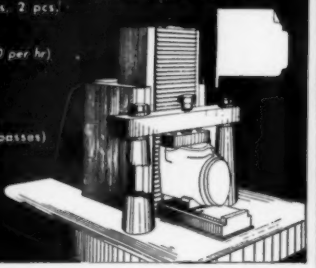
Part: Spring chair
Material: Rough malleable casting
Operation: Broach inner face
Production: 45 per hr
*(Former rate by milling: 14 per hr)*



Part: Anchor pin bracket
Material: Rough malleable casting
Operation: Broach two faces
Production: 50 per hr
*(Former rate by milling: 10 per hr)*



(Left) Part: Slack adjuster gear
Material: Machined steel
Operation: Broach internal splines, 2 pcs. at a time
Production: 200 per hr
*(Former rate by single pull broach: 50 per hr)*



(Right) Part: Gear housing
Material: Malleable iron casting
Operation: Broach 2 faces (2 passes)
Production: 40 per hr
*(Former rate by milling: 10 per hr)*

# Extrusion Process Arrives

STAINLESS steel, nickel alloys, bearing steel and non-ferrous alloys are now being extruded in the form of tubing, structural shapes, and rods as a result of notable developments in extrusion presses and metallurgical methods during the past five years, British engineer Albert B. Cudebec, recently tolds the Metals Engineering Division of the American Society of Mechanical Engineering.

Metal alloys which do not work well by rolling, welding, or piercing can now be economically extruded. "Several such alloys are being extruded in large quantities in Great Britain," Mr. Cudebec said, "but these have not yet been commercialized in the United States.

**Overseas**

"Soon after the British defense program got well under way, the metal-extrusion process quickly became so vital to national-defense purposes that 40 or 50 of these large plants are now in production in Great Britain. Moreover, several plants for the British commonwealths are either in production or are now being rushed to completion.

"It is not definitely known how many of these plants were in operation in France before the collapse, or how many are in use in Greater Germany, but it is probable that several dozen of them are now operating upon a 24-hr. basis. From these figures, one can visualize the probable expansion in extrusion plants which may occur in the United States before our present national-defense program is completed.

"The extrusion process does not compete in the ordinary field of carbon steel and is only economically interesting in handling expensive ferrous alloys and all nonferrous products. This field, however, is very wide as special alloys are now being substituted for heavier parts in almost every branch of mechanical-engineering design.

"Research in press design and in metallurgy, has recently been rewarded by the successful production of much larger presses than formerly existed. These advances have received the additional impetus of British national-defense requirements, and have caused the construction of presses for use in England up to 6600 - ton capacities. These presses are equipped with containers 48" long with a diameter of 20" and operate at 4500 lbs., per square inch hydraulic pressure. These large-capacity presses are required for handling aluminum and magnesium alloys, which are so vitally necessary to modern aircraft production.

**Production Range**

"Perhaps 50 per cent of the extruded products are finished profiles which only require straightening, and in some cases heat treatment, before being completed. The remaining 50 per cent of the production is extruded into round bars, strips, and other half - finished products. This latter material constitutes raw material for the subsequent processes of forming into thin strips and other articles, mostly by cold rolling. The reason why it is desirable first to extrude this raw material is because these light metals thereby acquire malleability and still retain their normal tensile strength and uniform grain structure in their finished state.

"Most of the extrusion tools were formerly imported into America from Czechoslovakia or from Germany, but

American tool suppliers began to furnish better and better tools. This proved as the domestic demand increased, to be a great help, as since the outbreak of the war, all extrusion tools are now produced in the United States of qualities which appear equal to any which have ever been imported."

Extrusion may be described as severe squeezing or "squirting" of metal through a die or orifice shaped in the form of the desired cross-section of the finished part. Structural aluminum channel shapes are now being extruded in sizes up to 12" high. Mr. Cudebec described the extrusion of round tubing of various alloys in sizes up to 5" in diameter and with wall thicknesses as small as 0.16" Involved shapes, not otherwise readily obtainable, are often extruded.

Considerable work in the extruding of aluminum shapes of many tyyes has already been done by the Aluminum Company of America, Pittsburgh, Pa.


Clean,
SHARPLY DEFINED
Scribed Lines
SECURED QUICKLY, EASILY
AND ECONOMICALLY WITH
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TRIAL OFFER: A handy five-ounce Combination Brush-In-Can ... ideal for shop use and for trial purposes ... for only 60¢
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DEFENSE
Demands Speed

Production must be raised to meet defense needs. That means eliminating production rate slumps resulting from operator fatigue.

When it is necessary for grinder operators to hammer, pry and force parts free from magnetic chucks repeatedly, they're wasting physical energy, as well as valuable time. When operators are tired, mistakes and accidents are more likely to happen —and quality suffers. Precision work may be damaged or distorted and chuck faces marred.

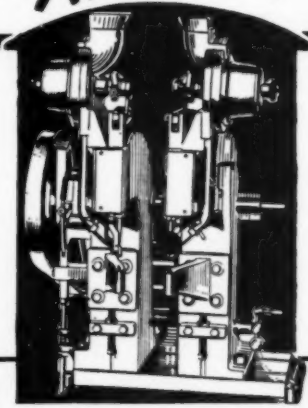
NEU-T-ROL releases the work promptly every time and demagnetizes it. Useful on small chucks, it is absolutely essential on heavy work.

There's a NEU-T-ROL for every size of magnetic chuck. Leading manufacturers will now supply NEU-T-ROL built into your new grinding equipment IF YOU SPECIFY IT. Or you can install it easily on equipment already in service. Write for full details.

Electro-Matic Products Co.
4036 N. KOLMAR AVE., CHICAGO, ILLINOIS

# WE *Cut* COSTS WHEN WE SWITCHED TO *Riveting*

"WE USED to weld, stitch, and crimp a lot of assemblies in our plant, until Chicago showed us how much could be saved with rivets. Now we use multiple-setting and do a complete job with one machine stroke. We rivet different materials together, something we couldn't do before. We assemble finished parts, because Chicago rivets don't harm the finishes. And we turn out stronger, better-looking jobs, saving money at the same time."



Set two rivets at once on any center distance from 7/16" to 7" with the Model 55, the Chicago rivet-setter that combines flexibility with multiple-setting economy.

**EXPERT RIVETING ADVICE**—*Send a drawing, sketch, or sample assembly for free, complete production analysis. Learn what riveting can do for you.*

**Chicago RIVET & MACHINE CO.**

1855 South 54th Avenue (Cicero P. O.) Chicago, Illinois

Tubular and Split Rivets in All Rivet Metals

Automatic and Manual Rivet-Setters for 1 to 4 Rivets at a Stroke

# What's New in the Industry

## Type T Hobbing Machine

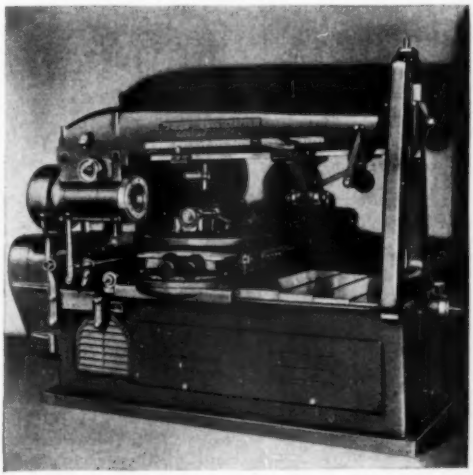
A NEW Type T Hobbing Machine, built by Barber - Colman Co., Rockford, Ill., is now available with new attachments and improvements. Although originally designed primarily for hobbing taper splines on shafts, it also has a wide application for standard hobbing work, including such parts as spur gears, spiral gears, straight splines, worms, worm wheels, and miscellaneous special hobbed forms.

In many respects it resembles the regular Type A, which is used on general purpose or high production hobbing work. The main difference is in the hob swivel construction of the Type T. It provides a means to traverse the hob, not only longitudinally but also laterally at the same time. The result is that the hob is fed in an oblique angle to the work, which is necessary in the hobbing of a taper spline on the end of a shaft. In hobbing other types of work such as spur gears, straight splines, spiral gears, etc., this same oblique hobbing method can be used, or the hob spindle slide can be turned around so that the ways are parallel with the bed ways.

In oblique feeding, the hob is fed across the entire face and in the case of hobbing a taper spline, which uses a tapered hob, the longest teeth enter the work first and cut the deepest part at the very end of the shaft. As the hob moves along the shaft, it also moves across, so that the progressively shorter teeth cut the shallower part of spline. At completion of cut, the hob is fed free of work.

A given hob can make a variety of tapers on a given diameter shaft, but for each different diameter shaft, a separate hob is required.

This advantage of feeding the hob across its entire face is also applied to standard hobbing work when the oblique feeding method is used. It places a small uniform load on each tooth for maximum hob life. In this oblique feeding method it is not necessary to make new hob settings. This is only done when feeding in the conventional manner. Hob settings are made in this latter case when a portion of the hob becomes dull.



A recent change has been to move hob spindle shoulder back to accommodate standard hobs up to 4" diameter by 4" length, which also permits a greater number of hob settings to be

made. This has been done so that the Type T machine can handle general classes of hobbing work economically.

Operating and controlling mechanisms for the machine are naturally somewhat different than on the ordinary hobbing machine. There is an additional feed screw in the lower hob swivel slide to give the hob its longitudinal traverse. A special micrometer dial is provided on work slide which permits operator to read at a glance, the exact height of center line of work spindle above center line of hob spindle. A similar dial on main feed screw covering the whole length of longitudinal adjustment shows the exact number of inches and thousandths between spindle nose and center line of hob carriage unit. These two dials are a great convenience in making original or duplicate set-ups. A scale is mounted on the overarm for positioning a fixed stop for properly loading work.

A single large gear box on left side contains all change gear trains. This permits a complete change gear set-up to be completed in one position. All controls are mounted on left hand front, convenient for operator.

A newly designed overarm has a larger cross section and is more heavily constructed for rigidity.

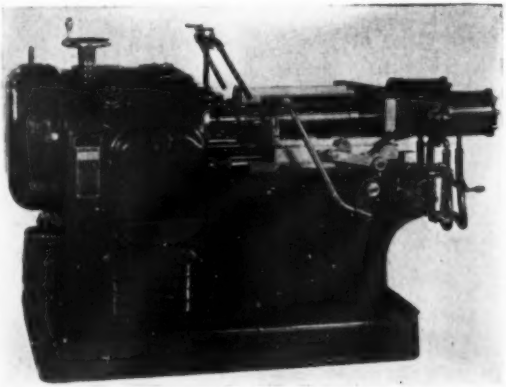
An additional safety switch prevents over run of the hob slide.

A spindle nose adapter is provided which has a No. 12 B. & S. taper. This permits interchangeability of work arbors with No. 12 and Type A hobbing machines.

Complete details are given in bulletin F-1403-2.

## Murchey Shell Tapping Equipment

The Murchey Machine and Tool Co., Detroit, Mich., announce a new series of single and double spindle machines especially designed to tap and chamfer the nose ends of shells.



Illustrated is a double spindle machine, arranged with lead screws, to tap and chamfer the nose ends of 4.5 Naval H. E. shells, a detailed view of the collapsible taps and nose end of the shell.

The special shell holding fixtures are designed to include "approximate" hardened and ground locating pads on which to locate shell within a few thousandths of concentricity with the spindle. (Locating pads may be changed for various sizes of shells.) After shell is approximately located on locating pads, it is picked up by means of a female center actuated by an air cylinder, with conveniently located hand valve, forcing shell forward until nose end is firmly held in a hardened and ground serrated bushing. This rigidly supports shell in perfect alignment for the tapping, and chamfering operations.

The hardened and ground serrated bushings, which support nose end of shell, may be changed to accommodate shells of different contours or sizes. The female center and length of stroke of air cylinder actuating same, can be designed to accommodate shells of various lengths.

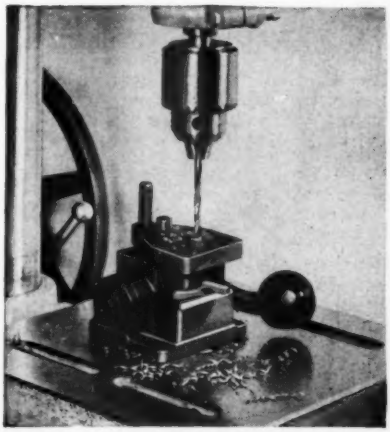
Spindles are equipped with Murchey Type "M" hardened and ground collapsible taps which include four ream-

Lag Perilous, Knudsen Warns Tool Industry

# ESCO

## "STANDARD" DRILL JIGS WILL HELP!

By — Reducing Design Time
— Reducing Loading and Unloading Time
— Speeding Up Production
— Reducing Rejects



THE ESCO MIJIT FOR SMALL PARTS MANUFACTURERS.

## SPEED & ACCURACY

Esco Drill Jigs, large and small, are now helping a great number of manufacturers to speed up production without sacrificing accuracy of finished parts, on machine gun components, airplane parts, electrical parts and a great many others where accuracy and finished work is as essential as rapid production.

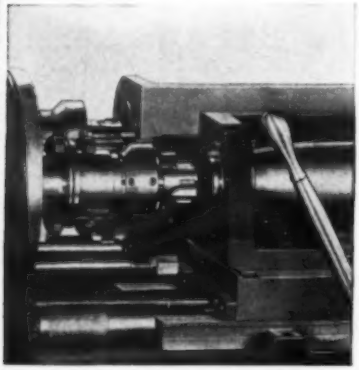
*Write for full information and prices.*

**ESCO ENGINEERING CORPORATION**

**4855 Fourth Avenue** **Detroit, Michigan**

ing tools as well as four chasers.

The collapsible taps are actuated by means of yokes operating between adjusting stops which trip the taps to predetermined positive thread length, and to reset taps for next operation.



The sequence of operations is to chamfer the shells with tap chasers collapsed and with lead screws disengaged. The carriages are then returned, automatically expanding chasers for the tapping operation. The lead screw is then thrown in and the shell is tapped in proper alignment and with correct lead.

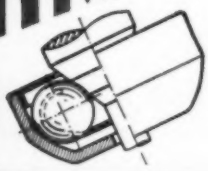
By completing tapping and chamfering in the same operation, spindle concentricity is maintained with a separate chamfering operation being avoided. The double spindle machine permits high production schedules.

## Announcing a New Shaper

A new precision Shaper with a rigid streamlined pedestal base is announced. The base is designed to give foot room for the operator to work in closely without stubbing toes. An innovation is the addition of a hand wheel to change motor speeds. This wheel is located on front of pedestal. By turning it, an infinite range of motor speeds is available. Removable louvre side plates provide proper motor ventilation and easy access to the interior. The heavy metal structure is engineered to eliminate noise and dampen vibra-

RMB

MINIATURE BALL BEARINGS



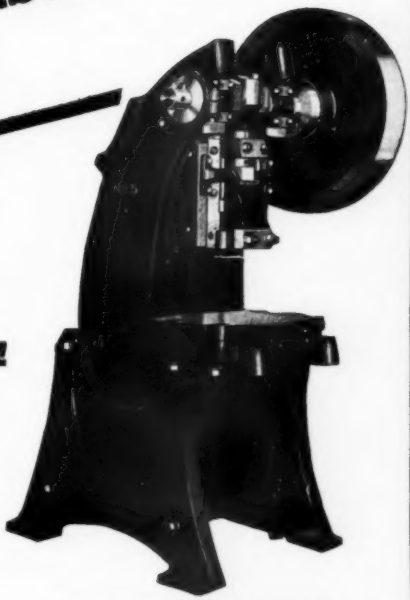
*This is Type P.1.5 Enlarged 20 diameters.*

A complete line of small Ball Bearings. Types for Radial, Axial or Angular Loads. Easily mounted — Widely adaptable.

*Write for Bulletin No. H-3.*

LANDIS & GYR, Inc.
104 5th Ave. New York

# STEP UP PRODUCTION with MARSHALLTOWN PRESSES



## The Most For Your Money!

Marshalltown Presses are engineered and built to give the utmost in dependable, trouble-free service. Features of design include more die space, chrome nickel cranks, wrist pin connections and many other proven advantages. Available in capacity of 5 to 70 tons—each one an outstanding value.

**NO. 5 FLYWHEEL TYPE**

*Write today for literature about Marshalltown Presses—available in capacities from 5 to 70 tons.*

**MARSHALLTOWN MFG. CO.**

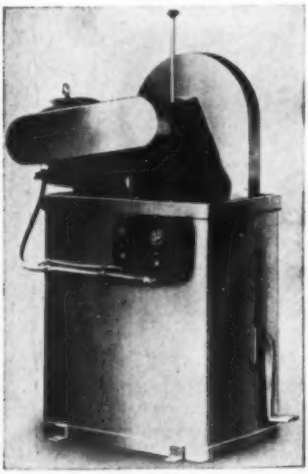
**900 E. NEVADA ST., MARSHALLTOWN, IOWA**

tion. The motor and hanging base mountings are cast integrally with pedestal to assure perfect alignment. The Shaper has a maximum stroke of 11¼". Ram length is 21" and 50 to 150 strokes per minute are provided in variable speeds. Floor space required for the entire assembly is only 24" x 36". More details may be obtained by writing Machinery Mfg. Co., at its new factory location, 1915 E. 51st St., Vernon, Los Angeles, Cal.

## Catskill Abrasive Cut-Off Machine

A new model "W" cut-off machine has been developed by Catskill Machine Co., Catskill, N. Y.

The abrasive wheel and motor are balanced on heavy cast iron "I" spindle frame, doing away with the necessity of counter weights or balances, materially lessening the load on the trunnion bearings. Ball bearings with Alemite lubrication are used for spindle and trunnion. Spindle frame has adjustable two-way stop to regulate depth of cut and save lost motion. Stock up to 3" can be handled.



Wheel guard is of heavy construction, bolted to base and equipped with rubber spray shields. Special panel can be removed quickly for changing wheels.

The base and coolant tank are of steel, electrically welded into one substantial unit. Coolant tank has welded baffle, forming separate sludge sump which is readily accessible for cleaning. Coolant pump is mounted on back of base, completely piped and wired to separate switch so that it can be controlled independently from main drive. Volume is controlled by valve, handy to operator.

Swivel vise allows cuts from right to 45° angles and is instantly and rigidly locked in place. Vise is equipped with vee blocks and adjustable foot holddowns, freeing operator's hands. There is no twisting or turning of clamps. Length gauge is substantially fastened to, and swings with the vise. It is adjustable from 0 to 30". May be quickly removed.

Spindle is of Alloy steel, ball bearing equipped.

Motor is of 5 h.p. capacity, 3 phase, ball bearing, 3600 r.p.m.

Power transmission is by 3 Vee belts. Wheel size is 16" dia., ⅞" hole, resinoid or rubber bonded. Wheel speed is 9000 ft. per minute. Coolant pump is ¼ h.p., 1725 r.p.m. Size overall is 27" x 38" x 60" high. Weight is 650 lbs.

## Conway Issues New Bulletin

A new Bulletin L-29, which shows the Series 160, 170, 180, 190, 2160, and 2180 Stud Drive Disc Clutches is offered by Conway Clutch Co., 1541 Queen City Ave., Cincinnati, O.

In capacity, they range from 13 to 200 h.p. at 100 r.p.m. A complete description of the clutches is given in the bulletin, together with the necessary mounting dimensions, horsepower, torque data, which is given in the charts.

## Industrial Hose Catalog

A catalog has just been released by the Hewitt Rubber Corp., Buffalo, N. Y., describing the wide variety of hoses which they offer to general industry. Users of machine tools will be especially interested in the Hewitt hoses designed for use with pneumatic tools and acetylene welding equipment.

# DON'T NEGLECT YOUR TOOLROOM!

## YOUR TOOL ROOM IS THE BACKBONE... THE VERY FOUNDATION OF PRODUCTION

* * * *

Present day production is based on high speed, efficiently sharpened cutting tools. Only correctly ground tools will give you MAXIMUM EFFICIENCY.

* * * *

Oliver Tool Conditioners assure properly ground Drills, Taps, Face Mill, Milling Cutters that will enable you to obtain more work between grinds—greater production per machine—less down time—lower tool cost—more accurate work—all at less cost to you.

* * * *

Oliver of Adrian offers you a complete Tool re-conditioning line—Send for details.

Cut illustrates the new Universal Tool and Cutter Grinder—handles a complete range of cutters and tools—simple to set-up, easy to operate—efficient on all operations.

Automatic Twist Drill Grinders, Face Mill Grinders, Tool and Cutter Grinders, Point Thinners, Tap Grinders, Die Making Machines.

# OLIVER INSTRUMENT COMPANY

1408 EAST MAUMEE STREET - ADRIAN, MICHIGAN

Today
**NATIONAL DEFENSE PRODUCTION**
Requires **SPEED!**
*SAVE TIME WASTE!*
*Use the BARKER Wrenchless Chuck*

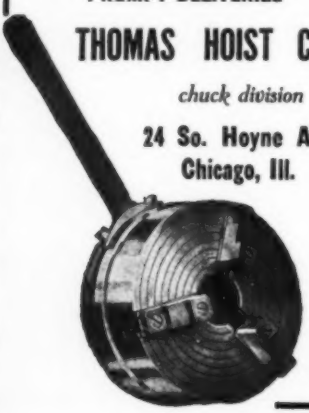
Don't let wrenching and adjusting waste your production time—keep your lathes working and not waiting. With the BARKER Wrenchless Chuck the usual chucking time is put into actual production.

It can be adapted to any type of work that may be done on turrets, engine lathes, semi-automatic or pipe threading and cutting-off machines. Users everywhere are getting high percentage increases in production. You can get similar results as soon as you put the BARKER to work.

The BARKER Wrenchless Chuck is simple and sturdy in construction. It is compact—requires no accessories to install. It permits bar work to spindle capacity. A quick movement of the lever releases or grips the work. Well adapted for a diversified line, from small brass castings to heavy forgings. Write TODAY for full details.

**PROMPT DELIVERIES**

**THOMAS HOIST CO.**
*chuck division*
**24 So. Hoyne Ave.**
**Chicago, Ill.**



## Jessop 773 Tool Steel

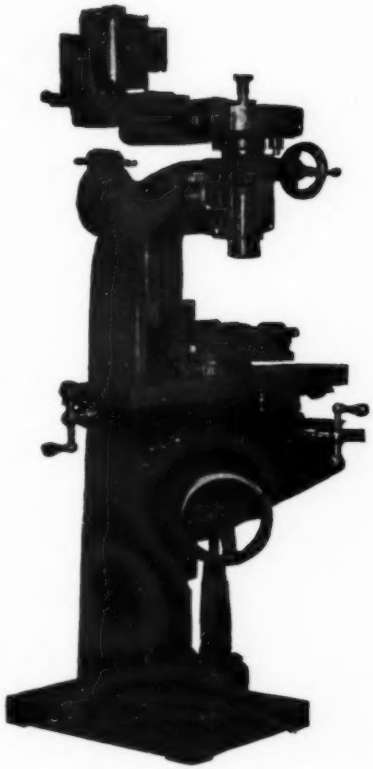
A medium carbon manganese-molybdenum steel, known as 773 Tool Steel, has recently been added by the Jessop Steel Co., 603 Green St., Washington, Pa.

"773" is said to possess unusual toughness — a property that adapts it for use in tools, dies, punches, cutting tools, chisels, etc., and for a variety of applications where exceptional toughness is required in thin sections, as in step down dies, spatulas, scraper knives, putty knives, etc. A ¼" section in the hardened and drawn condition (Rockwell C-58) will take a permanent set without cracking or bending.

The toughness of "773" is illustrated by tests conducted in an outside plant on a chisel made from this steel. It is related that the superintendent of this plant drove the chisel, corner first, into an anvil; using it for cutting unannealed steel; and finally supported it at both ends and repeatedly hammered the unsupported mid-section of the chisel. In no case was he able to break the chisel, nor did it show any signs of deformation, as can be seen from the unretouched photograph of the chisel which was taken after the tests were made.

# BREAK THAT BOTTLE NECK

## in your tool room with a



## 40-H INDEX

**at one third the cost you have in mind.**

**IT MILLS** slots, keyways, cavities, irregular curves with end mills ⅛" to ¾" diameter in tool steel.

**IT DRILLS** to accurate locations without layout.

**IT BORES** up to 3" holes in steel—vertical, horizontal or at angles.

**HAS VERNIERS** for locating 8"x16" at one setting.

The fact that we are constantly receiving repeat orders from users is proof of our machine's performance.

*Write for details and quotation.*

**Blank & Buxton Machinery Co.**

**3100 E. Michigan Avenue, Jackson, Michigan**

FOR AMERICA'S DEFENSE WORK OR ANY OTHER WORK, UNIVERSAL COLLET CHUCKS GRIP END-MILLS SECURELY . . .

Universal Collet Chucks use broken or whole straight shank tools. No tang required. Concentric to within .001. Adjusts within .002 depth. Grip as strong as solid steel. Write for complete facts and prices.

UNIVERSAL
Engineering Company
Frankenmuth, Mich.

Linley Bros. Co., 11 Montauk St., Bridgeport, Conn., announce a new vertical milling machine and jig borer. This is a high speed miller featuring a micrometer screw feed quill. This new departure employs direct reading, doing away with the necessity of pencil figuring and possible errors.

This modern milling machine can cut to any predetermined depth up to three inches. Other specifications are: — table size, 5½" x 14½"; longitudinal travel of table, 9"; crosswise travel of table, 5"; maximum distance from table top to spindle end, 9"; collet capacity, ½"; spindle speeds, 8 varying from 275 to 4250 r.p.m. Both floor and bench models are available. Bulletin "B" gives full details.

## Government Uses Safety Tools

Uncle Sam is the biggest buyer of safety tools in the country, according to Ampco Metal, Inc., Milwaukee, Wis., which manufactures and stocks over 400 different items in the safety tool line.

These tools are made of Ampco beryllium - copper or Ampco metal, which alloys emit no dangerous sparks in service. Safety tools should be used where gases or liquids might be ignited.

Practically every warship or defense craft in the Government service carries a complete assortment of Ampco safety tools, and orders are constantly being received for rush shipments as crafts put into port for repair.

Oil refineries have long been steady customers for safety tools, according to Ampco. Of recent months chemical plants, powder factories, and others in defense production have shown increased needs for tools of this type.

# Get this Book FREE

**Contains Valuable Information Direct From Shop Men Showing How They Have Smashed "Bottle Necks" and Licked Some of their tough problems.**

Based on a selection from thousands of Delta Installations in all types of plants—this compact little book, with photographs and text, shows how the adoption of the new type low cost machine tools is aiding American industry to meet today's productiou crisis. It explains why even the largest manufacturers in the country are using to advantage Delta low cost drill presses, cut-off machines, abrasive-disc finishing machines, metal cutting band saws, grinders, shapers and saws. It provides numerous examples of the ingenious adaptation of standard Delta units for special purpose machines at a fraction of the cost of ordinary machines or set ups.

**Send the Coupon**

Find out how how Kearney & Trecker, Eclipse Aviation, Alemite, Bell & Howell, Evinrude and hosts of other busy manufacturing plants are using Delta machines to increase production and cut costs. Simply mail the coupon below TODAY and a free copy will be mailed to you at once!

# DELTA

**Delta Manufacturing Company**

**613 E. Vienna Avenue, Milwaukee, Wisconsin**

Delta Mfg. Co., (Industrial Division)
613 E. Vienna Avenue, Milwaukee, Wisconsin
Please send me, without obligations of any sort, a FREE copy of your booklet "How to Increase Production".

Name.....

Address.....

☐ Also send me a copy of the latest Delta Catalog of low cost machine tools.

**FOR CUTTING!—**
Wire or rods up to 5/8-inch round or 3/8-inch square; You can't beat the
**WONDER CUTTER!**
Fast, easy to use and economical to own.
*Write for details.*

**FOR CLIPPING!—**
Band Iron up to 1/8 by 2 in. You've never seen the beat of it.
**The WONDER CUTTER is** the lowest-priced wire and band cutter on the market.

**THE FEDERAL FOUNDRY SUPPLY CO.,**
**4602 EAST 71ST STREET, CLEVELAND, OHIO**

## Production Lapping

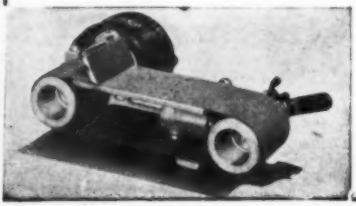
Ultra-Lap Machine Co., 227 McDougall Ave., Detroit, introduces a lapping machine which is claimed to increase production many fold as compared to hand lapping.

It is emphasized that any metal or materials, or any combination of such materials, whether hard or soft, is adaptable to the new quantity production.

The manufacturers guarantee a precision as to flatness of less than one light band—that is, twelve millionths of an inch and under — and as to smoothness, one micro-inch and under. They also contain a uniformity of finished parts that has not heretofore been possible; either by hand or machine lapping.

The Ultra-Lap Machine is now ready for further distribution to industrialists whose manufacturing processes call for precision lapping on a production basis.

*AN INEXPENSIVE* **ABRASIVE BAND GRINDER**

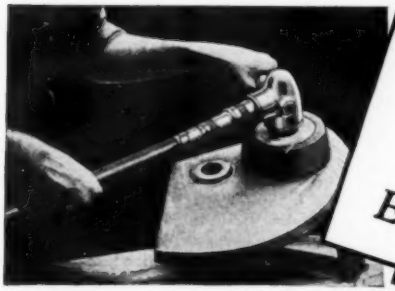


*"Built Like A Machine Tool"*

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on belt. Ball bearing throughout, equipped with Alemite lubrication, complete with grease gun.

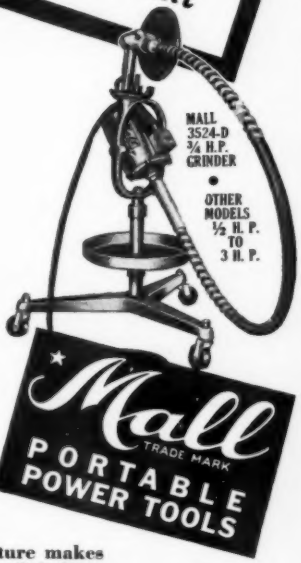
*Write for illustrated folder on this and other styles and sizes.*

**WALLS SALES CORP.**
**96 Warren St., New York, N. Y.**



**CONSTANT SPEED**
*Consistant as Electric Current*

# BLACKS OUT
## *The Bottleneck In*
## *PRODUCTION GRINDING*




**The constant working speed of MALL Flexible Shaft Machines assures a uniform flow of power to the working tool—eliminates lagging on light or heavy work—improves the finished job and keeps production moving at a high level.**

**Powered by a constant speed, heavy duty, aluminum frame dust and vaporproof or ventilated type motor—mounted on a high tilting, swiveling caster base—these units eliminate the need for frequency changers, generator sets and auxiliary piping and wiring. Thus they save on power and maintenance—take all of the dead weight out of the operator's hands—make power available in any position and permit a more efficient motor winding with a generous supply of copper and iron to dissipate operating heat.**

**In addition, the interchangeable attachment feature makes these all-purpose machines readily adaptable for Grinding, Sanding, Drilling, Wire Brushing and Polishing.**

***Write TODAY for FREE Demonstration of a Constant Speed MALL Flexible Shaft Machine in your plant and ask for our new 1941 Catalog of Industrial Equipment.***

## MALL TOOL COMPANY
**7742 SO. CHICAGO AVE. CHICAGO, ILL.**

***Manufacturers of over 200 gasoline engine, air and electrically operated tools and attachments.***

QUALITY CUTTERS

*The Standard of QUALITY*

All standard sizes carried in stock for immediate delivery. Special cutters made to Blue Print.

As Cutter Specialists since 1919 we are able to offer the highest *quality* and *service* at *attractive prices.*

*Write today for prices.* *Few Territories Open.*

**QUALITY TOOL WORKS**
Market St., Waukegan, Illinois

RECLINABLE POWER PRESSES

We manufacture a complete line of mechanical power presses, with sizes and types for every need in your shop.

*Write for bulletins.*

ZEH & HAHNEMANN CO.
Newark, New Jersey

## South Bend 16" Lathe Catalog

Catalog No. 16-T, illustrating and describing the new 16" Series "S" precision lathes, is offered by South Bend Lathe Works, South Bend, Ind.

The new 16" Series "S" lathes are made in three types:—Toolroom, Quick Change Gear, and Standard Change Gear. Each type is available with underneath motor drive, pedestal motor drive, or Countershaft Drive. The Toolroom Lathes are made in 6', 7', and 8' lengths. All other models are made in five bed lengths—6', 7', 8', 10' and 12'. Attachments for toolroom production and maintenance work are described, and features of construction are outlined in detail.

## Duro Issues New Catalog

An attractive new 56-page catalog (No. E-41-A) presents the extensive line of tools made by Duro Metal Products Co., 2655 N. Kildare Ave., Chicago, Ill.

There are many fine illustrations of details and the accompanying text tells the full stories of the many machines. Many of these machines will return a worthwhile profit, handling the smaller jobs and freeing the bigger machines for the larger jobs.

## American Potassium Cyanide

Domestic manufacture of potassium cyanide, a "strategic" chemical employed in hardening tool steels, is announced by E. I. du Pont de Nemours & Co. This chemical until now has been imported, but none of the imported material is now available. Production is under way in the company's R. & H. Chemicals Dept., at Wilmington, Del.

Company spokesmen said the development was prompted by current U. S. needs, and the urgency of national self-sufficiency. American raw materials will be used exclusively.

Potassium cyanide is important in heat-treating steel and in electroplating metals. It is also used in engraving and lithography. Du Pont is a large manufacturer of sodium cyanide, and pioneered in American manufacture of that related chemical.

## *Announcing the New Heavy Duty*

## CARBIDE TOOL GRINDER

**The "Big Brother" of our famous Model AA Carbide Grinder. Has all the features of the smaller machine . . . plus ample power for heaviest tools . . . provision for wet grinding . . . quick-acting indexing tables . . . high grade ball bearing spindle, with double V-belt drive.**

**Removes metal fast when rough grinding.**

**Finish grinds smooth keen cutting edges.**

***Write for complete details.***

# THOMAS PROSSER & SON

**120 WALL ST. NEW YORK**

**FAMOUS MODEL AA CARBIDE GRINDER**

**$99.50**

***10 Days Free Trial***

**This grinder will quickly pay for itself by increased tool performance and life between grinds. *Write for details.***

**TROYKE ROTARY TABLES**

**Accurate—Sturdy—Moderately Priced.**

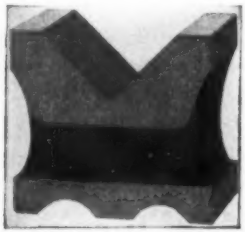
Made in 7 sizes from 9" to 25"

*Ask your dealer or write us for new 1941 8-page catalog.*

**ALFRED A. TROYKE. 4422 Appleton St., OAKLEY, CINCINNATI, OHIO**

## "Tru-V" Blocks

Accurate "V" blocks are especially useful in connection with many milling machine, shaper, planer, and drill



press operations—also for checking work in layout and inspection.

A new line of "Tru-V" Blocks in five husky sizes (4", 5", 6", 8" and 10") has been developed by Oliver Motorcraft Corp., 2532 S. Wabash Ave., Chicago, Ill. Special sizes are made to order.

Although made to sell at a popular price, the blocks are carefully machined on all sides, with close limits held within .001" where required. A machined ledge on both sides facilitates clamping down on machine bed. Full details are given in a descriptive bulletin.

**HOLD**

**Your Work to Machine Table with Howell Adjustable Clamps.**

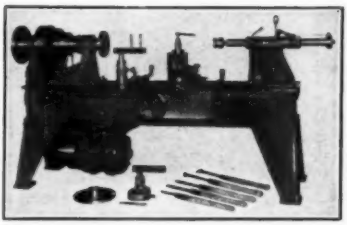
High Speed—Time and Trouble Savers—Simply Operated—Extremely Flexible—Wide Range.

*Send for Circular.*

**Howell Clamp Co.**
**1373 E. 95th St.**
**Cleveland, Ohio**

## Heavy Metal Spinning Lathes

Large size metal spinning lathes are now offered by the Oliver Machinery Co., Grand Rapids, Mich. These new lathes can be furnished in 16, 20, 24, or 30" diameter swing over bed. A



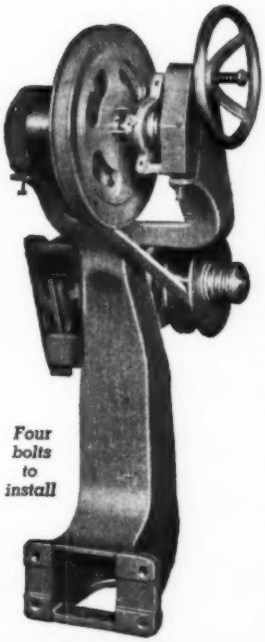
3 h. p., 1200 r. p. m. motor is provided for all sizes except the 30", which uses a 5 h.p. motor. Spindle speeds are approximately 1200, 1600, 2000, and 2400 r. p. m.

The headstock spindle features taper roller bearings with large thrust capacity. The manufacturer provides either plain bed or hand feeding carriage with compound swivel rest and tool holder, as shown in the illustration. Various types of tailstock are available.

These large machines are in addition to the lighter spinning lathes which Oliver has been producing for several years.

# A MOTOR DRIVE WITH INFINITELY VARIABLE R.P.M.

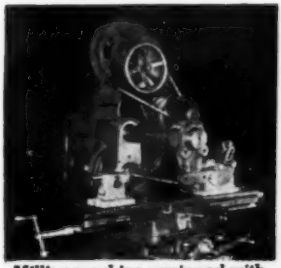
***for Lathes, Shapers, Milling Machines, Radial Drills, Screw Machines, Turret Lathes, and other machine tools***



*Four bolts to install*

THE GIVEN VARI-SPEED DRIVE provides positive, infinitely variable speeds within its ratio of 4 to 1, a greater range than that of other machine tool drives. Permits instant regulation of spindle or cutting speeds to a fraction of a revolution per minute. A large diameter single pulley eliminates all belt shifting and provides maximum power transmission. Convenient handwheel changes the speed of the driven tool while in operation. Faster and greater selectivity than gears or step cone pulleys. One piece frame. Low center of gravity. Dynamically balanced pulleys eliminate vibration. Ground belt surfaces. Ball bearings throughout. Adequate belt adjustment. Quiet. Smooth, Shockless. Safe. 1 to 5 h.p.

SEND FOR BULLETIN



*Milling machine equipped with Given Vari-Speed Drive*

**GIVEN**

**VARI-SPEED DRIVE**

**GIVEN MACHINERY COMPANY**

SANTA FE AVENUE AT MODOC

LOS ANGELES, CALIFORNIA

# LOOK

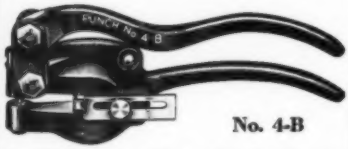
**for the Trade Mark**

**WAW**

***the sign of QUALITY***

CHANNEL

No. 8-B



No. 4-B

Our registered Trade Mark appearing on all our tools, punches and dies is our pledge of DEPENDABLE QUALITY and our guarantee that the tools will give entire satisfaction.

W. A. Whitney Channel Iron Punch shown above makes a ¼" hole in ¼" iron. The No. 8-B punches a ¼" hole in ⅛" iron. No 4-B—¼" hole in ⅛" iron.

*Send for our catalog today.*

It lists the complete line of W. A. Whitney Punches in every type and size to meet your need.

**W. A. WHITNEY MFG. CO.**

**ROCKFORD ILLINOIS**


## Industrial "Speedometers"

A very attractive broadside, "Productimeters — Speedometers of Industry," being currently distributed by the Durant Mfg. Co., Milwaukee, Wis., illustrates and describes their various counting and measuring machines for industrial application. Photographs of actual installations of Productimeters on Punch Presses, Drill Presses, Conveyors for bottles and cans, Wire Measuring Machines, and Pick Counters for Looms are shown together with actual size photographs of Model 5-H-1 Heavy Duty Stroke Counter.

This Company has been building counting devices for over 60 years, anticipating throughout the years, industry's demands for ever greater speeds and higher specialization. There are over 100 standard types of Productimeters carried in stock for immediate delivery, and special devices are designed and built promptly to meet individual requirements.


# Work Wanted

A NATIONALLY KNOWN MANUFACTURER OF PRECISION MACHINERY HAS FACILITIES FOR TAKING ON ADDITIONAL WORK for: W. & S. Turret Lathes, Boring Mills, Lathes, Punch Presses, Screw Machines, Precision Cylindrical and Internal Grinding, also Sub or Full Assembly Work.

**BOX 142**

**c/o Hitchcock Publishing Co.**

**508 S. Dearborn St., Chicago, Ill.**

# THE Conway Disc Clutch

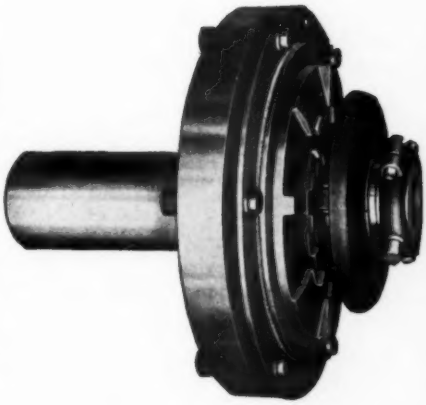
## has design, materials, and construction, all of the first line.

It is powerful, dependable, sturdy.

It is enclosed, and has centrifugal action.

It has easy engagement and instant release.

Its adjustment is an independent action; the regulation is precise; the scope of take-up is liberal.



Its functioning is smooth; its lines of force are centered; its capacity for peak loads and sudden shocks is remarkable.

It is the last word in friction clutches, and will certainly enhance the capability and sale-ability of your machine or product.

Bulletin L-29 is just off the press. It covers the regular duty line of Conway Disc Clutches—Stud Drive from 13 HP. to 200 HP.

However, look in your files for Catalog P-24, L-28, XYZ-L, S-10, 36A, K-32, and E-8,—all about Conway Clutches.

(*Patented in U. S. A. and Canada*)

## THE CONWAY CLUTCH CO.

**1541 Queen City Avenue, Cincinnati, Ohio**

# —GEARS—

**Spur—Helical—Worm—Bevel—Miter, Etc.**

We do broaching and all kinds of grinding.

We specialize in grinding hardened steel bushings, cam rollers, etc.

Prompt service and quality has retained a large list of customers for 25 years.

**TAYLOR MACHINE CO.**
1919 E. 61st St., Cleveland, Ohio


## A New Do-All Catalog

Recently prepared by Continental Machines, Inc., 1300 S. Washington Ave., Minneapolis, Minn., are comprehensive brochures describing in detail, the Doall Contour metal shaping machines manufactured by them.

Each book contains detailed specifications of the various Doall models manufactured by the company. The machines, built for continuous sawing, filing and polishing, are available in various sizes and capacities, to meet the demands of all industries. It is asserted that the most intricate of jobs to the largest of aircraft or shipbuilding parts are accommodated on these machines. The details of each model are Harrison, N. J. The Type 1002, as it is where they will have the greatest applications.

A complete catalogue also is available for all Government activities. This contains all of the data sheets annd detailed Government specifications are required for the writing of bids.

The brochures are available to manufacturers requesting same on their business letterheads.


PETERS

*Model A*

**Vertical Oscillatory GRINDER**

Highly trained workmen are not needed with this modern method of grinding and stoning dies and tools. These modern oscillatory grinders permit production savings up to 80%, with added accuracy, perfectly finished parts, rapid production and the ability to make quick job changes. Can be used on form tools including Tungsten Carbide.

*Send for bulletins giving full details.*

**PETERS TOOL CO., INC.**
**114 E. SCOTT ST. MILWAUKEE, WIS.**



**SPECIAL GAGE & TOOL WORK WANTED BY**

•

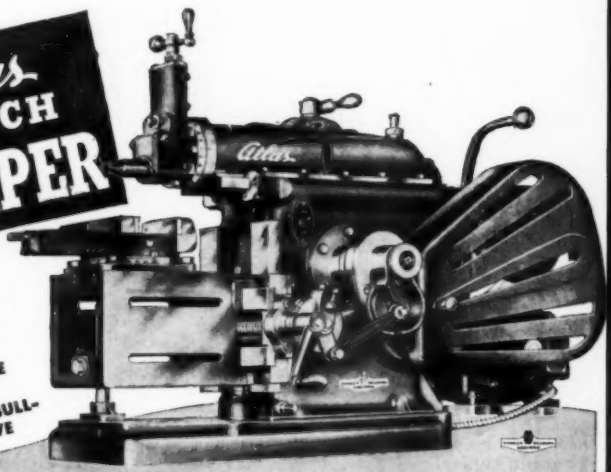
MODERN TOOL SHOP EQUIPPED WITH LATEST PRECISION MACHINES & INSPECTION EQUIPMENT

*PROMPT DELIVERY*

*REASONABLE PRICES*

**BOX 148**
**c/o Hitchcock Publishing Co.**
**508 S. Dearborn St., Chicago, Ill.**

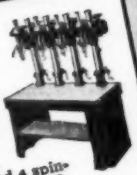
# Atlas 7 INCH SHAPER



4 SPEEDS
•
AUTOMATIC CROSS FEEDS
•
COMPLETE V-BELT DRIVE
•
CRANK-TYPE BULL-GEAR DRIVE

## TWO OTHER TIMELY Atlas TOOLS

**MULTIPLE SPINDLE DRILLING MACHINES**



Speed up work on drilling and tapping up to ½". 2, 3, and 4 spindles—$195, $310, $350 less motors (1/3 or 1/2 HP).

**LATHES**

The low cost way to step up production on small-part operations. Power cross feed standard equipment on the F-Series 10" models, prices as low as $107 for 36" bed. Atlas 6" Lathes as low as $66.50 less motor.

## *Handles Small Jobs Easier, Quicker, and Most Economically*

Now that Atlas has developed accurate, ruggedly built machines for all types of machining on small parts, larger machines can be kept steadily on big work. Result: speedier production and lower costs.

This compact Atlas Shaper, handling everything from ½" to 7" stroke, is a fine example of Atlas-engineered economy. Hundreds of tool room and shop superintendents can tell you about cost-cutting successes with Atlas Shapers on the job.

Has crank-type bull-gear drive, Timken tapered roller bearings, complete V-belt drive. There are 4 speeds, 5 automatic cross feeds. Operates from ½ HP motor. Price $265 less motor.

Ask your machine tool dealer and send for the new 1941 Atlas catalog for complete details.

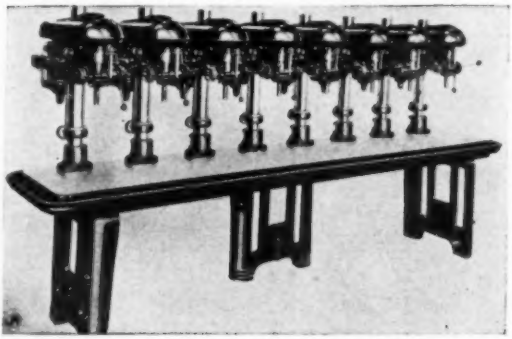
## ATLAS PRESS COMPANY

150 N. Pitcher St., Kalamazoo, Mich.

NEW YORK 130 W. 42nd St. | CHICAGO 35 E. Wacker at Wabash | PHILADELPHIA 113 N. Third St.

QUALITY SHOP EQUIPMENT SINCE 1911

## Sectional Drill Presses



Here is something new in low-cost drilling units — a sectional drill press which permits any user to make up his own drill presses to fit his exact needs—from a single spindle up—with any required number of spindles—all 14" or all 17" or any combination of both—with the drilling heads spaced to fit the user's individual requirements.

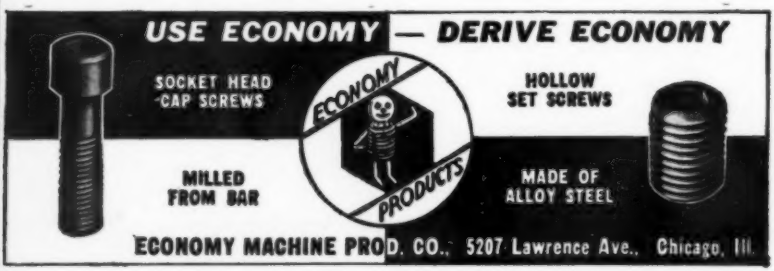
Each table section measures 22-⅜" deep by 30" wide (with ends—35" wide) — with room for two spindles—providing a minimum distance of 15" from center to center between spindles. The tables are accurately ground and fitted—and are heavy, rugged and accurate.

The advantages of this new type of drill press are many: — Each drilling unit can be made up to "fit the job" instead of making the job fit the machine All drilling and tapping heads can be placed in one row—with one continuous production table — thus eliminating costly transferring from one drill press to another—and reducing handling, trucking and inter-operation storage.

Maximum table working surface is available for large pieces. Finally—the cost of this new development is unusually low—due to the design and modern production methods used by the Delta Mfg. Co., 668 E. Vienna Ave., Milwaukee, Wis.

## Turret Lathe Earning Power

An attractive 28-page booklet has been issued by the Jones & Lamson Machine Co., Springfield, Vt., titled "Turret Lathe Earning Power." This booklet takes up turret lathes phase by phase with consistent emphasis on the question of earning power. The different subjects treated include:—foundation, spindle mounting, feed and speed controls, lubrication systems, safety, indexing, and many other features of turret lathe design.

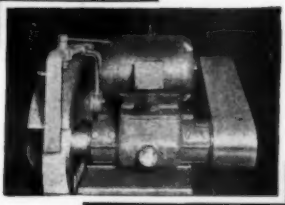



# » » FITCHBURG « «

## 35 YEARS' GRINDING EXPERIENCE

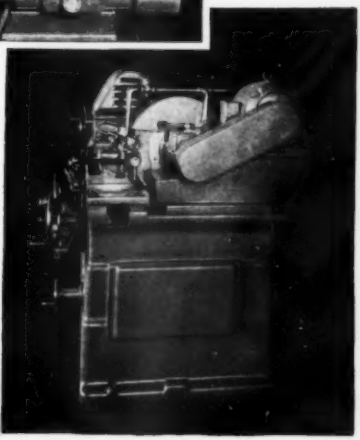
*is in the Design of this*

## NEW FITCHBURG PLAIN CYLINDRICAL GRINDER



**SPECIFICATIONS**

| | |
|---|---|
| Two Sizes | 6" x 18" and 6" x 32" |
| Grinding Wheel | 20" x 2" x 12" |
| Work Speeds | 90—575 R. P. M. |
| Table Speeds | 28"—188" P. M. |
| Table Graduated | .100 |
| Wheel Speed | 1238 and 1460 R. P. M. |
| Distance Floor to Centers | 42" |
| Floor Space | 18"—80" x 60", 32"—104" x 60" |
| Weight | 18"—4200 lbs., 32"—4400 lbs. |



All speed changes are controlled by variable pitch sheaves.

Infinitely stepless adjustments from minimum to maximum for both table and work speeds.

Pressure spindle lubrication for low viscosity oils allowing—

Close Bearing clearances for precision sizing.

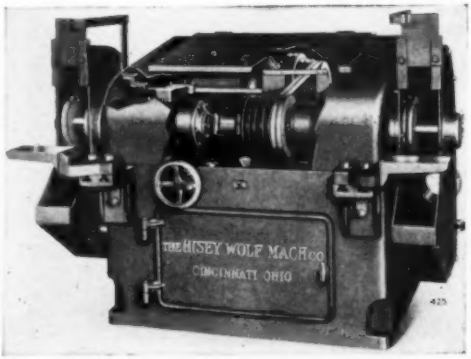
Complete details upon request.

**FITCHBURG GRINDING MACHINE CORP.**

FITCHBURG, MASS., U. S. A.

## "Hisey" Snagging Grinders

The Hisey - Wolf Machine Co., Cincinnati, Ohio, announces a new development in Snagging Grinders for high speed or vitrified grinding wheels. These machines are built for 18", 20", 24" and 30" grinding wheels.




The wheel guards are as adopted by the American Foundrymen's Ass'n. It is claimed to be impossible for a piece of work to jam between wheel and guard. Front of guard extends beyond periphery of wheel so that all sparks and chips are arrested.

Standard stock open rated motors can be used which are mounted on a dovetail slide base with screw adjustment. The screw extends through front of pedestal and has quick acting hand-wheel which is used to transfer belts from one set of sheaves to the next. Machines can be furnished with 1, 2, 3 or 4 speeds. A special safety device prevents overspeeding.

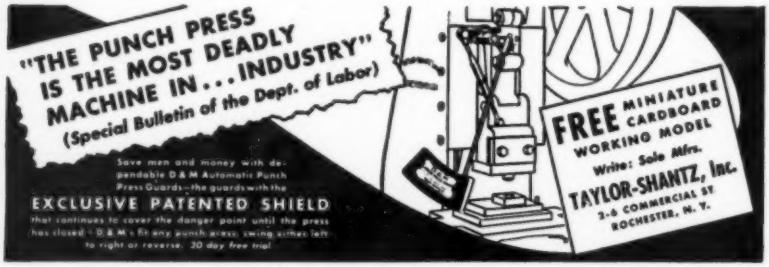
Spindle is made in two pieces and coupled. When coupling is removed, there is sufficient gap between the two spindles to remove or install new belt.

Constant level automatic oil lubrication is afforded and grinders are ball bearing equipped throughout.

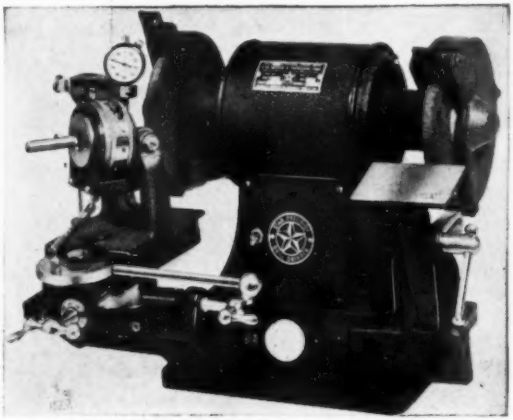
Flanges can be supplied for solid wheels with large bores.

## Bulletin on Steege Motor Drives

A new bulletin has just been issued by the W. L. Steege Machinery Co., 548 W. Monroe St., Chicago, Ill. It describes the Steege line of motor drives, which are declared to be adaptable to any cone pulley machine. These motor drives are constructed of sturdy semi cast steel throughout, with a minimum number of parts which makes for simplicity. A special feature of the Steege motor drives is the driven pulley, which is cast in one piece. It is asserted this guarantees that its Vee ways will keep tight for the life of the machine.


"THE PUNCH PRESS IS THE MOST DEADLY MACHINE IN... INDUSTRY"
(Special Bulletin of the Dept. of Labor)
Save men and money with dependable D & M Automatic Punch Press Guards—the guards with the
EXCLUSIVE PATENTED SHIELD
that continues to cover the danger point until the press has closed • D & M's fit any punch press; swing either left to right or reverse. 30 day free trial
FREE MINIATURE CARDBOARD WORKING MODEL
Write: Sole Mfrs.
TAYLOR-SHANTZ, Inc.
2-6 COMMERCIAL ST
ROCHESTER, N. Y.

# TRIM YOUR DRILL COSTS



*with a*

## STAR PRECISION DRILL GRINDER

**Produce Perfect Points on Drills**

**in Sizes from No. 41 (.096) to 5/8" (.625)**

Precision ground drills cut faster and last longer—do better work and trim production costs. That's the kind of drills you can have with a STAR Precision Drill Grinder.

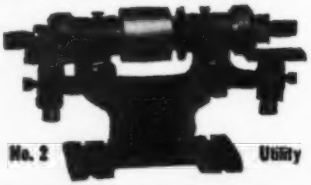
The STAR produces perfect points on standard twist drills—easily and quickly—without the use of attachments. It is equipped with a precision-made chuck which is adjustable for the entire range specified. Lip angles 29 to 89 degrees are obtained by setting the compound rest at the required reading. Each lip is set for the grind by indicator reading, making it possible to obtain variable clearances behind cutting edges. A zero setting gives a 12 degree clearance behind edge.

Simple to operate—speedy in action—dependable in results, a STAR Precision Drill Grinder will soon pay for itself through the savings which it makes possible.

*Send TODAY for descriptive folder.*

**STAR MACHINE & ENGINEERING CORP.,**
**Division Star Electric Motor Co., Bloomfield, N. J.**

**Clizbe Grinders**




**ELECTRIC and MOTOR DRIVEN**

You can grind faster, easier and more economically on a Clizbe. Manufactured for long hard service in every style and size.

Reasonably priced but built to highest standards. Bench or floor type, belt or motor driven, plain or ball bearing.

*Send for Clizbe latest grinding data book.*

**CLIZBE BROS. MFG. CO.**

PLYMOUTH INDIANA

**The M-B "Utility" Pneumatic Grinder. Model U.—T. R.**

**A 60,000 R.P.M. Unit**

**Steel Housing (For Safety)**

A WORTHY COMPANION TO OUR *FAMOUS* "SUPER SPEED" MODEL S. S.–S. R.

SPECIAL GREASE SEALED BEARINGS NO LUBRICATION REQUIRED.

AN ABUNDANCE OF POWER.

OTHER MODELS, ALSO AIR LINE FILTERS AND AUTOMATIC AIR LINE LUBRICATORS.

*Write for details and data on free trial offer.*

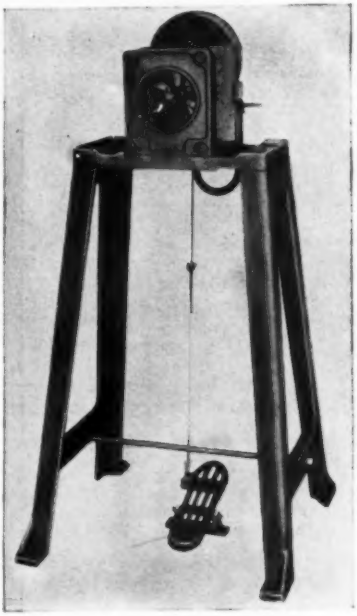
**M-B PRODUCTS**

**130 E. LARNED ST. DETROIT, MICH.**

**Export Office: 44 Whitehall St. New York, N. Y., U. S. A.**

## Multiple Hole Piercing Machine

A new tube piercing machine is offered by the Automatic Mfg. Co., Inc., Harrison, N. J The Type 1002, as it is called, has a capacity approximately four times as great as that of the Type 1001, which was put on the market in 1939.



These multiple hole piercing machines can be used on round, square, rectangular, or poly-sided pieces, provided they are open at one end. They will make holes which are round, rectangular, or any other shape for which it is practical to make a punch. The machines will pierce ordinary metals, bakelite, certain plastics, or other punchable materials.

The manufacturer emphasizes that these production tools are safe to operate, economical to tool, and require very little time for set-up. They can be handled by inexperienced operatives.

# Cuts Non-Ferrous Metals with POLISHED Smoothness

## New Delta Low Cost CUT-OFF MACHINE

This new Delta Cut-Off machine is designed especially for cutting copper, brass, aluminum and other non-ferrous metals with polished smoothness. It is equipped with a special high-speed steel blade and oiling device which feeds cutting oil to the blade. It leaves the cut perfectly smooth, thus eliminating additional finishing and polishing operations. Here is a powerful accurate machine made available at a fraction of the prices customarily charged for machines of this type. It can be used anywhere, in large shops or small, where non-ferrous metals have to be cut to accurate length on a production basis.

### Cuts These Materials

**Solid Sections:** Soft Brass up to 1½" diameter; Half-Hard Brass, up to 1¼" diameter; Aluminum, up to 1½" diameter; Aluminum Extruded Sections, up to equivalent of 2 sq. in.; Copper, up to 1½" diameter, or equivalent of 2 sq. in.; Magnesium (Dow Metal), up to 1¼" diameter; Micarta and Similar Rods up to 1½" diameter.

**Tubular Sections:** Soft Brass, Hard Brass, Aluminum, Copper, Dow Metal, Micarta and Similar Tubing, all up to 2" diameter.

### Many Special Features

This improved Cut-off Machine is ruggedly constructed with heavy castings throughout—wide spaced Timken roller pivot bearings and double arbor sealed-for-life bearings requiring no lubrication—powerful Texrope V-Belt drive—adjustable fence—accurately machined table. It is perfectly balanced, making for easy operation—cuts material at any angle and embodies unusual safety features such as husky chip guard, belt and wheel guards.

No. 1631 Non-ferrous Cut-off Machine. With blade guard, belt guard and chip guard.

**Send for Special Cut-Off Machine Bulletin** giving full details and prices on this Delta Cut-off Machine and all accessories.

**DELTA MFG. CO.** (INDUSTRIAL DIVISION)

618 East Vienna Avenue, MILWAUKEE, WIS.

Please send me special bulletin on the new Delta Cut-off Machine for non-ferrous metals. Also send latest Delta Catalog of Industrial Power Tools.

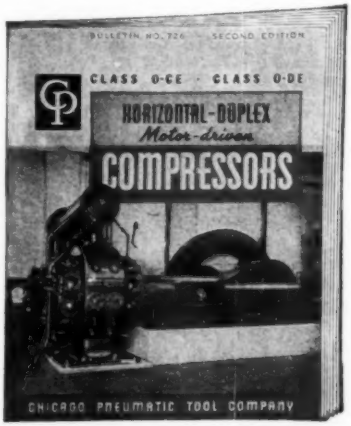
Name .....

Address .....

City ..... State .....

## Chicago Pneumatic Compressor Bulletin

A new bulletin is offered by Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y. It is lavishly illustrated with large, clear photographs and cross-section drawings which show the new models of their horizontal-duplex motor-driven compressors. The bulletin goes into great detail, showing recent improvements in construction of compressors in capacities of 350 to 10,000 cubic feet per minute for pressures of 80 to 125 lbs. The manufacturer emphasizes such advanced features as




Simplate valves, three-step and five-step control, and automatic starting unloader. The compressors employ flood lubrication of bearings and it is asserted that the machines have superior intercooler design.

## Midget Slitter Grinder

A new slitter grinder is offered by Samuel C. Rogers & Co., 203 Dutton Ave, Buffalo, N. Y. The "Type CC Midget Grinder," as it is called, is a compact, rugged, bench type utility

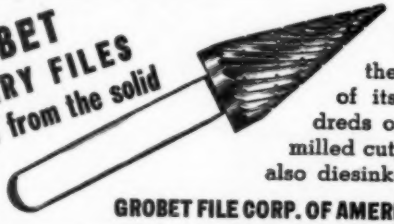
TANNEWITZ DI-SAW
SAVES AN AVERAGE OF $4.80 EACH HOUR IT'S USED

Inside and outside cuts on dies, shoes, templets and endless other jobs can be done in a small fraction of the time required by former methods. Saws, files and polishes. A highly developed, large capacity machine.

*Write for literature.*

THE TANNEWITZ WORKS
GRAND RAPIDS - MICHIGAN

GROBET
ROTARY FILES
ground from the solid



Ask for Catalog WG

the most complete catalog of its kind, illustrating hundreds of rotary files hand cut, milled cut, ground from the solid; also diesinkers' burs.

GROBET FILE CORP. OF AMERICA 3 Park Pl., New York, N.Y.

# Leading Dealers from Whom You May Purchase Your Torch.

Andrews Hardware & Metal Co., Los Angeles, Calif.
Greenspon's, Hartford, Conn.
Fries Beal & Sharpe, Washington, D. C.
Standard Automotive Supply Co., Washington, D. C.
W. D. Allen Mfg. Co., Chicago, Ill.
Anderson & White Sup. Co., Chgo.
Automatic Htg. & Cooling Sup. Co., Chicago, Ill.
Chas. H. Besley & Co., Chicago, Ill.
Clark and Barlow Co., Chicago, Ill.
Samuel Harris & Co., Chicago, Ill.
Max A. R. Matthews Co., Chicago
Ogden Hdw. & Sup Co., Chicago
Pulver Machinists Sup. Co., Chicago
Stebbins Hdw. Co., Chicago, Ill.
Steege Machinery Co., Chicago, Ill.
Wieboldt Stores, Inc., Chicago, Ill.
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Barrett Hardware, Joliet, Ill.
Mid States Industrial Corporation, Rockford, Ill.
Louis Hansen's Son's, Davenport, Ia.
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St. Louis Machinists Supply Co., St. Louis, Mo.
Concord Hardware & Plumbing Supply Co., Concord, N. H.
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Kraut & Finke Co., Hackensack, N. J.
Monmouth Plumbing & Supply Co., Red Bank, N. J.
Hand Hdw. Co., Elizabeth, N. J.
Patterson Bros., New York, N. Y.
Orr Supply Co., New York, N. Y.
Hanson & Yorke, New York, N. Y.
Neal & Brinker Co., New York, N. Y.
Schmidt Bros. Plumbing & Htg., Binghamton, N. Y.
Weed & Co., Buffalo, N. Y.
Sullivan County Plbg. & Htg. Sup. Co., Liberty, N. Y.
M. Frisch & Sons, New Brunswick, N. J.
Amer. Plbrs. Sup. Co., Toledo, O.
Alaska Junk Co., Portland, Ore.
Beighley Hdw. & Tool, Pittsburgh, Pa.
Stockdale Hdw. Co., Tarentum, Pa.
Geo. T. Bartley Co., E. Liberty, Pa.
Paul Devitt Co., Upper Darby, Pa.
United Hdw. & Sup. Co., Erie, Pa.
Sees & Faber Co., Philadelphia, Pa.
Girard Plbg. Sup. Co., Phil., Pa.
Swank Hdw. Co., Johnstown, Pa.
Eastern Pa. Sup. Co., Wilkes Barre, Pa.
Fulton Mehring & Hauser, York, Pa.
Lappe Supply Co., Pittsburgh, Pa.
Hoffman Auto Parts, Butler, Pa.
C. A. Michel & Co., Pittsburgh, Pa.
Wm. H. Taylor Co., Allentown, Pa.
Reading Fdy. & Sup. Co., Pottstown, Pa.
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Campbell Hardware & Supply Co., Seattle, Wash.
Oliver H. Van Horn Co., Houston, Tex.
Cordes Sup. Co., Milwaukee, Wis.

# National Pumpless Safety Torches

## *More Heat—Less Fuel*

**Model 300**

A hotter flame free from soot and carbon monoxide gas. A pumpless safe torch with no lead seat in the fuller plug. High margin of safety and steady burning, makes this the outstanding value in the blow torch field.

Model No. 300 is of 6 ounce capacity. Designed for small jobs and intricate work. For side flame merely tilt the torch. Burns at full capacity for 6 hours.

This No. 100 2 ounce torch burns longer and produces more heat than ordinary torch. Fits in tool box or mechanic's pocket. Produces flame from a pin point to 6" long.

**Model 100**

Model No. 200 shown with Blow Torch Furnace is of pint capacity. Outperforms any quart torch—burns as long — produces greater heat.

*See your dealer or write us today.*

**National Safety Device Co.**
836 W. Hubbard St., Chicago, Ill.

grinder for circular slitters and straight corner cutters. It will sharpen any type of slitter knife, single or double bevel or square edge, within the capacity of the machine.

An outstanding feature is the use of two motors to drive the slitter knife and the 6x½x½" grinding wheel. This is said to assure correct peripherial speed for precision grinding.

This new Midget Grinder will handle slitters including 6" diameter; the attachment for grinding corner cutter knives will sharpen knives up to 8" long. A drill grinding attachment is available which will sharpen drills up to ½" diameter.

## Strand Issues New Catalog

An attractive new catalog with handsome plastic ring binding is offered by N. A. Strand & Co., 5001 N. Wolcott Ave., Chicago, Ill. It presents 80-pages of flexible shafts, machines, attachments and accessories and is the largest and most complete Strand catalog ever issued.

Incidentally, the Company is starting its 36th year. The Strand line has grown steadily, year after year, until it now covers every line of industry, with 65 types and sizes of machines—vertical and horizontal—direct drives and variable speed drives.

5000 Shapes and Sizes Grobet Swiss Files

Write for Catalog WF

The most complete catalog of its kind. Lists 5000 different shapes, sizes and cuts of GROBET Precision Swiss files.

Learn more about these chrome Steel Files that have won a reputation for utmost precision and durability.

*Ask also for catalog WM on Files for Filing Machines; catalog WR on Rotary Files and Diesinkers' Burs.*

GROBET FILE CORP. of AMERICA • 3 PARK PLACE NEW YORK CITY

"CHIEF—HOW ABOUT TOOLS FOR THESE CUTTING, DRILLING AND TAPPING OPERATIONS?"

"THAT'S EASY BILL—WE'LL USE THOSE NEW BOICE-CRANE METAL CUTTING BAND SAWS AND DRILL PRESSES. WE CAN GET THEM QUICK TOO!"

**Boice-Crane tools break up "bottlenecks"—and you can get them NOW! They get jobs out quick, fast and economically in production, tool room, experimental departments.**

## Revolutionary New Band Saw for Production or Tool Room

**Saws nearly everything — wood, sheets, rod, tube, brass and aluminum casting gates. The perfect small machine for production, tool and die shops, experimental work. Built like expensive machines. 8 speeds from 75 to 2,200 f.p.m. Powerful V-belt drive through gear box. One-piece welded steel frame. Extra large trunnions hold table true for heavy jobs. New type guides for split-hair contour work.**

***A wonder-worker of a tool at a low price!***

## Drill Presses to Meet Your Exact Needs

**Boice-Crane makes over 60 different Drill Presses — the right types to tool your light drilling and tapping to a "T" for expanded production and lower cost. No delivery delays—you can get them NOW! Our specification sheet will quickly show why industry prefers Boice-Crane Helmet Heads. High and lo-speed; one, two and four spindle; bench and floor types.**

## GET THESE TWO BOOKS NOW!

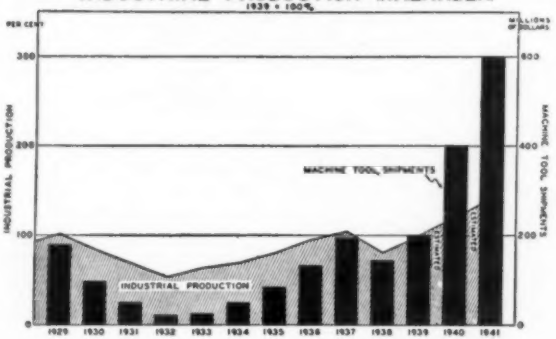
**POWER TOOL CATALOG** listing 10 different types of industrial Power Tools that do many jobs faster and better. A valuable file aid on many tooling problems.

**8 PAGE DRILL PRESS AND TAPPER FOLDER.** Lists all types, also heads and parts for special machines, accessories, etc.

write **BOICE-CRANE CO.** Div. C, Toledo.O.

**BOICE CRANE COMPANY • TOLEDO OHIO**

## No "Bottleneck" Here


MACHINE TOOL SHIPMENTS AND INDUSTRIAL PRODUCTION (F.R.B. INDEX)
1939 = 100%
PER CENT
MILLIONS OF DOLLARS
INDUSTRIAL PRODUCTION
MACHINE TOOL SHIPMENTS
MACHINE TOOL SHIPMENTS
INDUSTRIAL PRODUCTION
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941

Practically the entire output of the nation's vastly expanded machine tool industry is destined for the national defense program of the United States and the defense of England, with by far the major share going to United States aircraft builders and other manufacturers of national defense requirements, according to a survey just completed by the National Machine Tool Builders' Ass'n, Cleveland, O.

The survey is based upon information as to plant expansion, employment, and engineering and development work undertaken on behalf of the national defense program, obtained from 115 companies representing approximately 80% of the total machine tool capacity of the country.

Increased output, the survey explains, has been accomplished by plant expansion, by the installation of new equipment, by sub-contracting work to outside companies, and by training large numbers of new men and thereby operating equipment as continuously as possible.

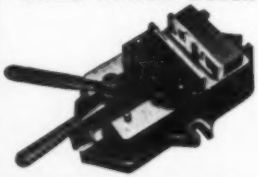
Employment in the industry, according to the survey, has more than doubled in the last two years, with the bulk of the increase occurring in 1940.

In discussing the industry's employee training program, the survey states "The result may be summed up in the startling fact that well-nigh half of

**BREMIL MFG. COMPANY**
**1700 Pitts. Ave., Erie, Pa.**

ALL-ALLOY compound lever strap cutter. Cuts 1½ strap with one stroke.

**HARD USAGE Doesn't Faze The HARTFORD MILLING VISE**



Because it was designed to "take it"—and it does! It will stand up, day after day, under the heaviest, toughest strain of production milling work. Made of the best materials, with all parts interchangeable, it will outlast four or five ordinary vises. Rapid and accurate in operation—the top eccentric handle gives tremendous binding force, while the lower cam-faced handle gives instantaneous quick-opening and return. A trial in your shop will convince you better than anything we might say.

*Write for Folder and Complete Details*

**Jaw width ..... 5'' Maximum opening 3½''**
**Jaw depth ..... 1¼'' Weight ..... 40 lbs.**

**Also made in the swivel-jaw type with hard or soft jaws, maximum opening 2¼''.**

We also Build Machinery on a Contract Basis, Design and Develop Special Automatic Machinery—Gears and Cams Cut to Order.

**HARTFORD SPECIAL MCHY. CO.**
**285 HOMESTEAD AVE., HARTFORD, CONN.**

# STOP-LOOK-SAVE

## R AND L TURNING TOOLS

STOP the losses which will become increasingly important with rising production schedules. You can go a long way in that direction with R & L Tools. They save hours in set-up time . . . and the multiple operation feature cuts production cost, permitting two or three operations to be performed simultaneously . . . for example, drilling, turning and burnishing at one time. R & L tools save time and money on multiple spindle machines, where otherwise, additional operations would be required.

LOOK into the possibility of using R & L tools in your plant. Others have found that R & L tools speedily pay for themselves, and thereafter return a worthwhile profit.

SAVE at least $200 on the initial cost alone—over the investment required for separate tools to handle the jobs you can do with one R & L costing but $65. In addition to the operating savings, R & L maintenance is less, due to sturdiness and simplicity and a minimum number of wearing parts.

*Surely you will want the whole story on R & L Savings. Write TODAY!*

**R and L Tools, 1825 Bristol St., Nicetown, Philadelphia, Pa.**

**DEARBORN Automatic Chucking and Indexing Fixture MILLS OVER 1000 PARTS PER HOUR**

Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

**J. W. DEARBORN**
72 S. CLIFF ST. ANSONIA, CONN.

**LINK SPRING TESTING EQUIPMENT**

For testing Compression, Tension, Torsion and Flat Springs.

Capacities available: 0-10 lbs., 0-50 lbs., 0-250 lbs., 0-500 lbs., 0-1000 lbs. and 0-3000 lbs. Manual and Motor Operation.

Electronic Control available for rapid production testing with automatic indication of results.

**Tester Shown**

*Model PB4-250 with Electronic Control.*

**LINK ENG. & MFG. CO.**
1956 West Baltimore Ave., Detroit, Mich.

the nation's machine tool employees today have been trained on the job since September, 1939."

The survey cites many instances of the engineering and development work done by machine tool builders in order to meet the special needs of the makers of national defense equipment and help speed the defense program.

A chart accompanying the survey and reproduced here shows that machine tool production, which in the peak of the year 1929 totalled $185,000,000, averaged only $23,500,000 in 1933. A slow recovery from the depression brought the volume to $85,000,000 in 1935 and then to $200,000,000 in 1937. The chart indicates that defense production will reach $400,000,000 in 1940, with an anticipated output for 1941 of $600,000,000.

## Booklet on Porous Bearings

An attractive illustrated bulletin on "Selflube" porous bearings is offered by the Keystone Carbon Co., Inc., St. Marys, Pa. The manufacturer refers to the Selflube bearing as "the bearing with a million oilwells," with an average porosity of 35%. Evidently the material is capable of absorbing a large amount of oil which often can supply lubrication for long periods of operation.

Selflube material is said to have a tensile strength of over 35,000 lbs. per sq. in. It is available in the form of an extensive line of plain bearings, flanged bearings, thrust bearings, and rectangular plates. Most of these standard sizes and their code numbers are listed.

**HOTEL ESSEX**

Guaranteed comfort—and we mean it. Latest colored tilecombination tub and showers—newly furnished and decorated thruout — You'll like it.

**$1.75** SINGLE Ellis at Larkin ● **$2.50** DOUBLE San Francisco, Calif.

# Jarvis

## HIGH TORQUE TAPPERS

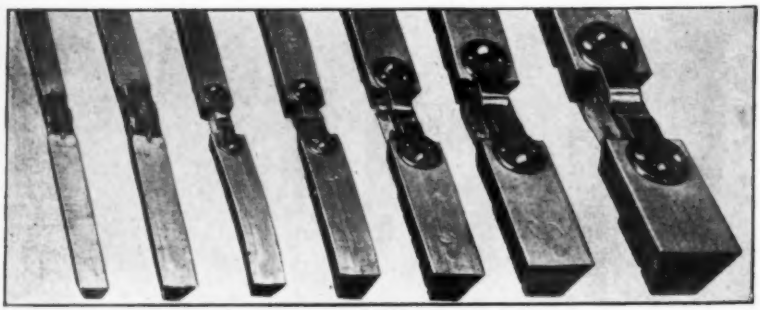
Have you tried the new sensitive Jarvis tappers with the new high torque frictions?

These new frictions make tapping a decidedly simple and inexpensive operation. These Jarvis tappers are equipped with neutralizing device and all spindles are running on ball bearings. May we submit one of them for approval?

**The CHAS. L. JARVIS Co.**

MIDDLETOWN • CONNECTICUT

*CHICAGO OFFICE AND STOCK* — *1344 W. WASHINGTON BLVD.*



## Lacings for V-Belts

The manufacturers of Grip-Flex belt lacings have recently added a new line called "Rola-Flex." This is made especially for the larger sizes of leather and fabric rubber V-belts sizes A to E.

An additional model called "Tite-Grip" is made for very small leather or fabric rubber V-belts. This connector is claimed to be four times stronger than the wire hook connector now in general use on small belts. The flexing tension at the connection so nearly equals the flexing tension of the body of the belt, that it is claimed to provide a smoother belt flow. These belt lacings are made for belts as small as 3/8". Tite-Grip can be connected to the belt ends with simple tools. Bulletin No. 41-C fully describes these new type connectors. Address Shippert Mfg. Co., 414 C. S. Galena Ave., Dixon, Ill.


# *Important in Defense Production*

## MOREY 27" Manufacturing Lathe

Specially designed for turning and boring shells, but is equally effective for other single purpose operations. Features directional finger tip control.

## Automatic Roughing Lathe

Employs a special carriage with a front multiple tool holder and 2 adjustable cut-off tool holders in the rear, arranged with a complete hydraulic cycle. The front tools are fed into the work, then longitudinally until the shell is turned. Simultaneously, the cut-off tools cut the shell to length. Upon completion, all tools are automatically withdrawn and returned to starting point. May be operated by non-skilled labor.

***Let us send you complete details.***

**MOREY MACHINERY CO., INC.**

410 BROOME ST., NEW YORK, N. Y.

## Flaw Detection

A new type of equipment, suitable for the location of surface or submerged flaws in non-magnetic metal parts was described at a recent meeting of the American Society of Mechanical Engineers in New York.

The development was announced by Ross Gunn, Technical Adviser and Superintendent of the Division of Mechanics and Electricity, U. S. Naval Research Laboratory, Anacostia, D. C.

The new apparatus further widens the field of non-destructive testing of metalic objects, supplementing the X-Ray method, the Magna-Flux procedure for magnetic metals such as iron and steel, and other recent developments.

It is especially useful for inspection of sheets castings and other fabricated units made of aluminum, copper, duralumin and non-magnetic stainless steel. It is said to meet a need increasingly felt in recent years, due to the rapidly increasing production of parts made of these metals.

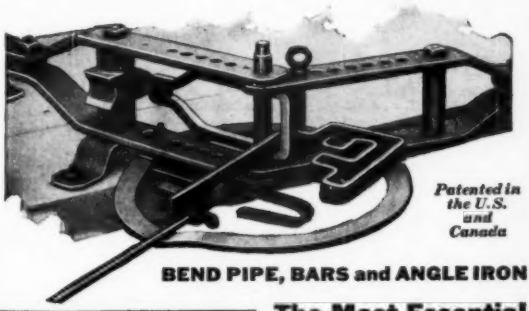
The new equipment described by Dr. Gunn detects flaws by inducing a predetermined pattern of electrical eddy currents in a perfect test sample of the metal to be inspected, by the use of alternating magnetic fields.

Sensitive pickup coils, properly disposed in relation to the eddy currents, measure in any similar part being tested only the departures of the eddy-current pattern from the pattern in the perfect sample.

It is convenient to have two types of electrical indicators for use with the equipment. One is used for rapid surveys to indicate the presence of gross defects. The other may be employed for more detailed analysis.


**Save Money on Countless Jobs! Get a**

**HOSSFELD IRON BENDER**



*Patented in the U.S. and Canada*

**BEND PIPE, BARS and ANGLE IRON**

**Samples of Bar Bending**

**The Most Essential Shop Tool Made**

Makes any bend, hot or cold, in an instant. Don't waste time with heats, hammering, vises, jigs. With a Hossfeld you quickly, accurately form any bend, to any angle. Quick adjustment; no wrench needed. Fully guaranteed and practically unbreakable. Made in two sizes. The larger size bends 2" pipe cold. Get a Hossfeld Bender NOW.

*Send for folder No. 2 TODAY.*

**HOSSFELD MFG. COMPANY**

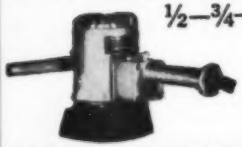
**WINONA, MINN.**

CUTS GRINDING COSTS

½—¾—and MORE

HEAVY DUTY

3 Phase
60 Cycle
No Brushes



GASTON POWER TOOLS
2655 W. 95th St., Evergreen Pk. Ill.

DON'T DISCARD IT . . . . .

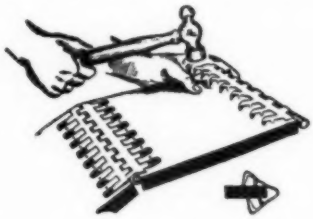
Effect a 30% to 75% saving in tool costs, by having your worn-out or obsolete tools made over by RENU — and guaranteed as good as new, both for appearance and performance.

Renu Tool Co.,
875 E. Milwaukee Ave.
DETROIT, MICHIGAN

Renu IT!

## Armstrong-Bray Offer 8" Lacing

Answering an oft-expressed demand for belt lacing suitable for ⅜" thick belt 8" wide, a 45-T box is now offered by Armstrong-Bray Co., 315 N. Loomis St., Chicago, Ill. Lacing for belts of this



thickness have been in the 12" and longer sizes previously, but the new 45-T box should fill a popular need.

## "Colorflex" Chart

An attractive color chart has been issued by Flexrock Co., 2305 Manning St., Philadelphia, Pa., illustrating in actual color reproductions, the shades which may be obtained with this new floor dye.

Battleship gray, tile red, linoleum brown and emerald green give quite a range of choice available in industrial floor finishes, which may be used indoors or outside.

Resistant to acids, alkalis and fire, the gloss finish is claimed to "wear like iron."

OPEN THE WAY TO GREATER PROFITS

BY USING S & S HINGES

BUTTS AND CONTINUOUS LENGTHS — for GUARDS — CABINETS — CASES — BOXES — LUGGAGE
WRITE FOR CIRCULAR

S & S MACHINE WORKS
HARDWARE DIVISION

4539 WEST LAKE STREET CHICAGO, ILLINOIS

## Quality Control

"Feeding vitamin "A" to workmen, more than $5000 a year for the past three years was saved through reduction in the number of off-color parts in assembling electric ranges." So says R. F. Bisbee, Supervisor of Quality Control at Westinghouse's Mansfield, Ohio plant.

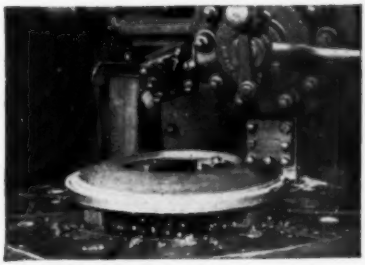
Scientific packing was responsible for a much greater saving — and these economies are said to have permitted price reductions which stepped-up sales.

Improved seeing conditions were provided by a so-called "Tunnel of Light" with mercury - vapor lighting, giving 200 footcandles intensity at the center of the tunnel. This also helped to reduce color-mis-matching rejects.

Investigation disclosed that the sensitivity of the human eye is dependent upon changes which take place in a substance called "visual purple" which is contained in the eye's retina. In order for the eye to maintain its color sensitivity, the amount of this visual purple substance changed, must be replaced or regenerated continually. This fact paved the way for the vitamin "A" therapy, for it was found that if the rate of regeneration of visual purple is below normal, the use of vitamin "A" therapy will bring it up to, or higher than normal in almost every case. A well balanced diet of foods containing sufficient vitamin "A" will accomplish the same result.

With this retinal fatigue preventive, the seeing accuracy of the inspectors is said to have been improved to such a degree that color rejects on the assembly line have now been reduced from a 1935 average of 1.7 to an average of only .3% for the last 36 months.


Production DOUBLED

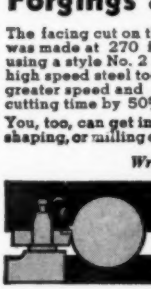


KENNAMETAL Faces Steel Ring Forgings at 3 TIMES Former Speed

The facing cut on this forged ring of SAE 1045 (280 Brinell hardness) was made at 270 ft./min., .011" feed, and up to ¾" depth of cut—using a style No. 2 KENNAMETAL tool. The shop had previously used high speed steel tools at 90 ft./min. and .018" feed; thus at three times greater speed and 11/18ths the feed, KENNAMETAL reduced actual cutting time by 50%.

You, too, can get increased production on your turning, boring, facing, shaping, or milling operations by specifying KENNAMETAL-tipped tools.

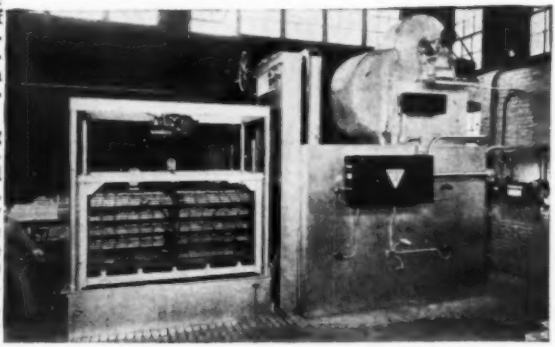
*Write for complete information today.*



McKENNA METALS Co
135 LLOYD AVENUE
LATROBE, PENNSYLVANIA, U.S.A.

## Aluminum-Magnesium Heat Treatment

A new furnace for the heat treatment of aluminum and magnesium alloys is announced by Despatch Oven Co., Minneapolis, Minn.



An interesting sidelight on its performance is related by the makers. No. 195 aluminum alloy castings should have a minimum tensile strength of 29,000 pounds and elongation factor of 8%. Castings which were processed in a Despatch furnace are said to have had a tensile strength up to 33,000 pounds and elongation up to 12%.

Further it is claimed to have cut off time from the processing cycle which permits more production from a furnace of a given size.

Interior uniformity of the furnace is given as 5 degrees plus or minus F, when operating at 950 degrees F. This is brought about by the use of oversize, large volume, high static pressure fans. Air velocity through the furnace is said to exceed 20 miles per hour which assures rapid, uniform heat treatment

The quench tank and elevator system are also of Despatch design. On this particular job with other equipment, up to 40 seconds were allowed for quenching of the parts. With the Despatch system, it was possible to quench in about 18 to 20 seconds giving plenty of safety factor.

While this unit is equipped with an electric heating system, it may also be equipped with a gas heating system to meet the individual requirements.


**A Tote Pan of Many Uses**

Durable — Liquid tight — 5 gallon capacity — pressed from 1/16" sheet steel — 21-1/2" x 13-3/4" x 5-3/4" inside.

*Write for low prices today.*

**The Salem Tool Co.**
SALEM. OHIO

*This* DIRECT DRIVE COUPLING
FOR RESILIENTLY MOUNTED MOTORS
*Improves Performance*

Features rubber cushion, made with **exclusive** oil-resisting treatment. Gripped permanently by die-cast ends. No parts to get out of order, become noisy or need replacement. Provides ample flexibility for minor angular and lateral misalignment. Custom-made to fit job. All sizes.

*Write for samples.*

**GUARDIAN UTILITIES COMPANY**
**209 East Michigan St. Michigan City, Ind.**

GUARDIAN
FLEXIBLE COUPLINGS

## Personnel

"To an extraordinary degree, our defense program, as well as our ability to meet industrial competition depends upon science and technology."

Continuing at a recent A. S. M. E. session, Dean A. A. Potter of Purdue University emphasized that there is already an acute shortage of technical and supervisory talent in certain industries concerned with defense, as well as in the Army and Navy.

The airplane industry reports a definite shortage of stress analysts, test engineers power plant designers and draftsmen. Thousands of additional engineers are needed who are competent designers of tools, dies, etc. This is true of many industries.

There are about 165 institutions in this country which offer instruction leading to degrees in engineering. These schools realize that in the present emergency, they must maintain the strongest possible programs of study. Nearly all of these schools have offered to the U. S. Office of Education, the fullest cooperation in training for defense.

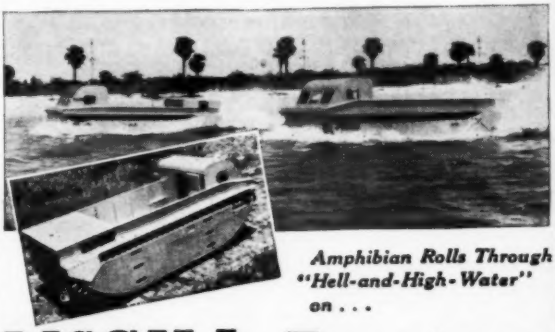
It is impossible to speed up the present undergraduate programs of study, but engineering schools with special facilities should be utilized in the following ways:

1—Institutions near industrial centers may be able to utilize their staffs, equipment and facilities for in-service training of special value in up-grading the supervisory and technical personnel in defense industries.

2—Institutions not in industrial centers may carry on certain types of in-service training on the engineering school level through extension classes.

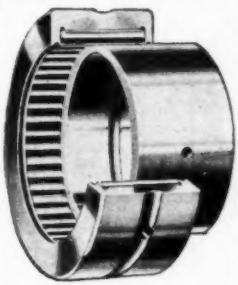
3—Intensive resident programs of study, of from one to eight months.


. . . and NOW — a Sea-Going Tractor!



*Amphibian Rolls Through "Hell-and-High-Water" on . . .*

McGILL Bearings



Land, sand, water, mud or muck . . . "The Alligator" sea-going tractor that Uncle Sam has specified for HARD jobs rolls over and through everything from swamps to open sea because it rolls ON dirt-proof, water-tight and dust-tight McGILL Roller Bearings. Designed by McGILL for the Amphibian—only one of many McGILL applications.

A combination of bearing demands, conservatively termed "unusual," is the normal schedule for the many McGILL Completely-Sealed Roller Bearings in "The Alligator."

What are your bearing requirements . . . McGILL has, or will make, the proper bearing for the task involved. Ask for complete details — ask us to prove it to you.

Bearing Division

McGILL MANUFACTURING CO.
1700 N. LafayetteSt., Valparaiso, Ind.

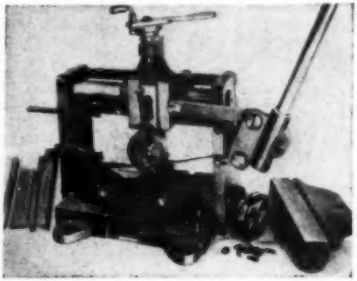
**SAVES YOU TIME—MONEY—SPACE**

Saves time because all stock is in view. No looking around. Saves money because original cost is low. Saves space because very little required. 4 arms, 51" high, stacks 10,000 lbs. flat or round stock, 5 arms 57" high 12,000 lbs. Tubing less weight — 3 stands for 20' lengths or 2 for 12' or shorter. Use against wall or back to back in center of room. Small cost—big value.

**WM. S. YOHE SUPPLY CO.**
503 Mahoning Rd. N. E., Canton, Ohio


## Round and Flat Marking Machine

A new machine for marking round and flat parts including tapered articles is offered by H. O. Bates (The AcromarK Co.), 259 N. Broad St., Elizabeth, N. J.

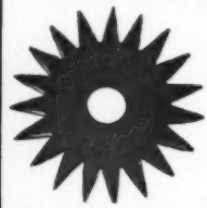


Several have just been placed in use for marking aircraft parts and the machine is adaptable for marking names, specification numbers and other information into a variety of shapes and sizes. The marking area takes parts up to 10" x 4" and for round pieces, the product is rolled as a flat die impresses the mark, whereas flat parts are marked with a roller die.

Suitable holding fixtures can be furnished for special shapes and sizes. Holders will take steel type or solid lettering dies and both are quickly interchangeable for any marking.


**THE CHAMPION LINE**

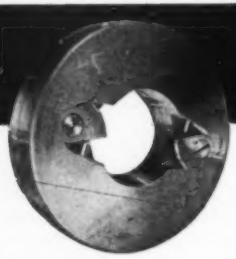
**Toolholders, Expanding Mandrels, Shop Furniture, Emery Wheel Dressers and Cutters, Etc., Etc.**



**Winners on merit and performance — leaders in quality and design.**

*Write for Catalog*

**The Western Tool & Mfg. Co.**
**1632 E. Pleasant St., SPRINGFIELD, OHIO**



*for your lathes* **SENECA FALLS** *Automatic* **WORK DRIVER**

Self Centering . . . Quick Acting . . . No Slip. Attaches to any chuck plate or spindle. Provides a slip-proof, balanced drive reducing chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

**SENECA FALLS MACHINE CO., 314 Falls St., Seneca Falls, N. Y.**

## Lubrication

Lubrication of bearings operating under extremes of temperature from 40° below to more than 400° above zero F., and at extremely low and high speeds, as well as when exposed to chemical fumes, dust, water and solvents was discussed at the recent Machine Shop Practice Division Meeting of the A. S. M. E.

The occasion was presentation of a report by Virgil M. Palmer and Charles L. Pope on developments in Eastman Kodak Co.'s, program for industrial lubrication during the past five years.

In service, petroleum products oxidize and form organic acids. Obviously, these acids attack some metals more readily than others. They destroy bearing surfaces and form metallic soaps which contaminate the lubricant.

Some metals and metallic soaps act as catalysts and accelerate oxidation of the lubricant. Metals of different potential promote galvanic action. Lubricants which contain some organic acid and pick up moisture become good electrolytes. In lubricating equipment containing dissimilar metals, excessive oxidation of the oil and addition of moisture should be prevented.

Among new controls for aiding in "preventive maintenance," Mr. Palmer described a new sound-recording apparatus, used on machinery much as a doctor uses a stethoscope. Bearing failures are accompanied by increase in running temperature or by a change in the character of the sound. When there is a change in the sound of ball or roller bearings, failure often is imminent. The apparatus includes a crystal microphone, placed on the bearing or on some stationary part of the machine. Sound waves are picked up, amplified and recorded on a chart moving at a fixed speed.

GITS
CONSTANT LEVEL
OILERS
unbreakable
FIXED CONSTANT OIL LEVEL—is your protection against varying oil levels resulting from tampering and vibration.
Incorrect oil levels cause burned out or flooded bearings. Overcome this trouble with GITS constant oil level oilers.
Complete details furnished upon request.
GITS
FILL THROUGH BOTTLE NOZZLE
CANNOT BREAK. BOTTLE NOT MADE OF GLASS
ALWAYS FILL HERE
EXCLUSIVE FEATURE. BOTTLE HINGED TO CUP. PATENTED
BOTTLE WILL AUTOMATICALLY RETURN TO ITS CORRECT POSITION AFTER FILLING
OIL LEVEL ALWAYS CONSTANT
GITS BROS. MFG. CO.
1860 South Kilbourn Ave. Chicago, Ill.
30 years of oil cup experience

# Join The Chain Making Gang
## Nilson Chain Making Machines

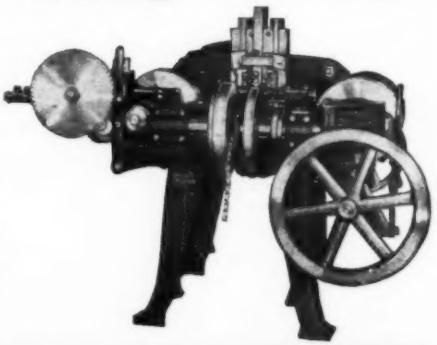
To make a full line of standard size chains as known to the trade, Nilson makes the four necessary sizes of machines. The chains made by these machines are strong, durable, safe and flexible.

The most important feature of the chains made by these machines is that ends are tucked in, making them perfectly smooth on both sides, and increasing the tensile strength 20%.

These chains are smooth to handle and will run through the hands without injury. They will run accurately on sprockets for conveyors or power transmission purposes.

We also make machines for forming the straight welded chain, for twisting the chain, and for forming the cross chain and hook.

*Send for our bulletin today.*



The A. H. NILSON Machine Co.
BRIDGEPORT, CONN., U.S.A.


parts could be built up even more by the Metalizing process, polished and then chromium plated.

Far from being makeshifts, it has been proven that the chromium plated parts give superior service. The hard, polished chromium surfaces reduce friction while resisting wear and corrosion.

In the center of the display is shown a high pressure steam pump valve, chromium plated for protection against corrosion — also airplane brake strut parts.

Several Diesel engine valves are shown, chrome plated for longer life—also pneumatic tool parts similarly plated.

Another application, decidedly profitable from the standpoint of the user is in connection with dies and punches, especially where the punches are lapped or superfinished. The hard polished chromium surface wears longer and there is less tendency toward galling or firing. The latter is blamed for much of the punch breakage that results from adhesion of small metal particles to the punch surface. Lapping and chrome plating largely overcome this trouble.

Two affiliated Companies are associated with Master Chrome Service. They are the Master Tool Co., Inc., Cleveland and the Eastern Cutter Salvage Corp., Newark, N. J. Their service is especially helpful in the present emergency when deliveries of new tools are uncertain—when it is imperative that production tools be maintained in condition for maximum production.

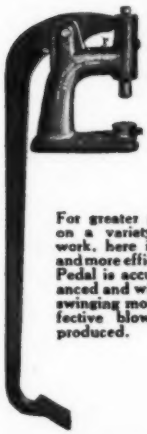

SCHAUER Speed Lathes

For Finishing Lapping Polishing small parts

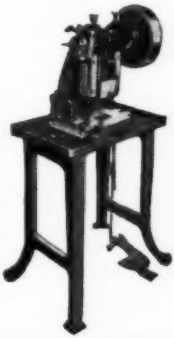
Production necessities; timesavers. Specially designed to handle finishing operations more speedily and at lower cost.

*Write for NEW circular 400.*

SCHAUER 2964 Reading Road, Cincinnati, Ohio



# Rapid Production of Small Parts Nilson Foot and Power Presses



For greater production on a variety of light work, here is a lighter and more efficient press. Pedal is accurately balanced and with an easy swinging motion, an effective blow is easily produced.

These Presses are designed for rapid production of small parts. The operator is relieved of actual labor and his work is merely control of a semi-automatic machine.

Safety clutch is provided which absolutely prevents repeating, regardless of whether or not the treadle is released. By turning a handle the press is instantly converted into a continuously running machine.

Our No. B O Foot Press and No. B 2 Power Press are shown. We also manufacture a No. B 3 Power Press which is larger and more powerful. Our Power Presses can be equipped with toggle feed, dial feed, or wire straightener and former.

*Let us send you complete details.*

The A. H. NILSON Machine Co.
BRIDGEPORT, CONN., U.S.A.

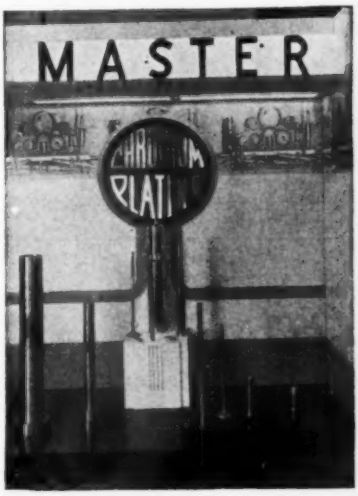

## Industrial Chrome Plating

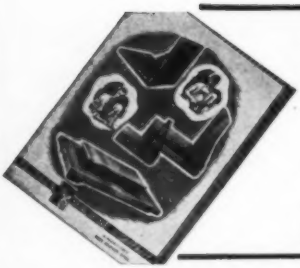
In spite of precautions, errors in machining will happen now and then. When important parts like spindles, shafts, axles, valve stems, gauges, etc., are machined undersize, it means expensive additions to the scrap pile.

Such discards represent a direct loss of labor and material, irrespective of production tieups and delays in delivery. Sometimes substandard parts are used in special assemblies with the other parts altered to compensate, but that means departures from standard designs.

A sound modern practice that is gaining favor is to build up such parts with hard chrome plating. This was exemplified by the display of Master Chrome Service, Inc., of Cleveland at the recent National Metals Show.

The display included an automatic screw machine spindle which had been built up .082" by hard chrome plating. Where necessary, chromium deposits up to 1/32" can be applied, or the





**HAVE YOU CONSIDERED**

**MILLIKEN Angle irons, beach and surface plates?**

**Who else can offer all these advantages?**

1. MILLILOY—A new semi-steel cast iron—minimum warpage—four times the wear.
2. A choice of three types of finish.
3. A wide variety of sizes.
4. A standard for 30 years.
5. Delivery out of stock.

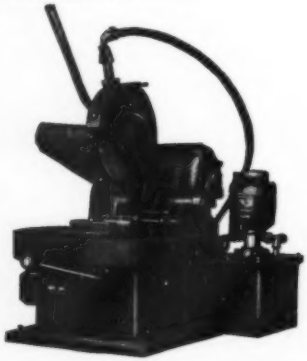
Write for our latest folder. It contains an authoritative and interesting story on the newest improvements in these basic production tools.

**MILLIKEN MACHINE COMPANY**

**23 Prospect Place, West Newton, Mass.**

## "Abrasaw" Cut-Off Machines

Two new wet cut-off machines are announced by The Bridgeport Safety Emery Wheel Co., Inc., 1270 W. Broad St., Bridgeport, Conn.



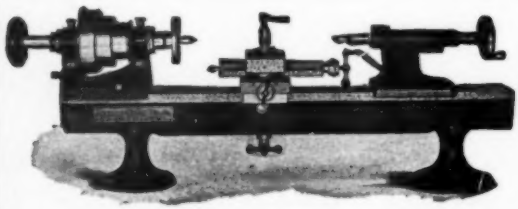
Model 48-W cuts practically all materials used in industry, speedily and accurately, producing polished surfaces that often eliminate secondary finishing.

Solids up to 2½" diameter; tubing and light sections up to 3½" are handled. Power is supplied by a 7½ h.p. motor operating at 3600 r.p.m., driving the disc through six V-belts. Disc head and driving motor balance each other on a rocker shaft, mounted in Timken roller bearings.

Vise swivels on table and may be set at any angle up to 45°, angle of cut being accurately set to a graduated index plate attached to vise.

Machine is regularly furnished for 16" diameter discs with 1" holes, but may be equipped for 12" or 14" discs. A variety of disc flanges is furnished to provide support for the abrasive discs.

The 47-W machine was developed as a companion machine to the 48-W, for installations where there is need for real production on lighter stock than is normally cut on the larger unit. While the smaller machine has smaller capa-



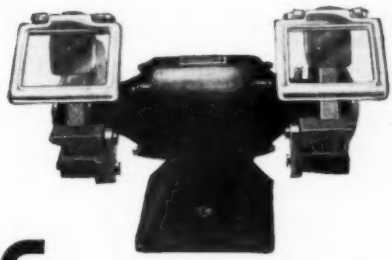
**WADE**

**Bench Lathes**

Economical, accurate, enduring for turning, drilling, threading, grinding, milling and screw machine operations.

**Wade Tool Co.**

**Waltham, Mass.**



# B-LINE

**De Luxe**
BENCH AND
PEDESTAL
**GRINDERS**

From ¼ to 5 H. P. . . . .Many exclusive Features; Patented Wheel Lights, combined with Spark arresters over each wheel . . . . Lamps can be replaced by ordinary automobile head or tail light bulbs . . .Adjustable Tool Rests & Safety Glass Eye Shields . . . meet Safety Code Requirements . . . .TWIST DRILL GRINDING ATTACHMENT for both straight and taper shank drill bits from ¼" to 1¼", with micrometer adjustment, can be furnished extra.

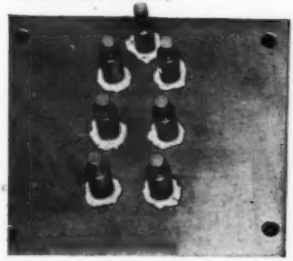
*Write for Informative Bulletin No. 1004, today.*

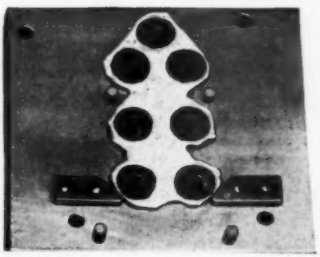
**THE BROWN-BROCKMEYER CO., Inc.**
*Leading Independent Motor Manufacturers*
DAYTON, OHIO

# Locate punch, die and machine parts faster and more accurately with CERROMATRIX

A LOW-temperature-melting alloy that expands slightly on solidifying. Saves hours—often days—in die making and locating of machine parts without expense of drive fit, many other applications. Send for free manual.

**CERRO DE PASCO COPPER CORPORATION**
40 WALL STREET, NEW YORK, N. Y.





PYRO THE SIMPLIFIED OPTICAL PYROMETER

Unique construction enables operators to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

THE PYROMETER INSTRUMENT CO.
102-105 Lafayette St., New York, N. Y.

SPECIAL HEAVY DUTY
DEMAGNETIZERS
RAPID DELIVERY
*SEND FOR LITERATURE*
R. B. ANNIS COMPANY
INDIANAPOLIS, IND.

city, it has the same rugged, durable construction as the 48-W.

The 47-W handles solids up to 1"—tubing and light sections up to 2". It is driven by a 3 h.p. ball bearing motor, through three v-belts. Controls are convenient and accessible and self-contained coolant systems are included with both machines.

## Wardwell Offers New Catalog

Saw sharpening machinery and tools are the subject of a catalog just released by the Wardwell Mfg. Co., 3165 Fulton Rd., Cleveland, O. This large, attractive, 44-page booklet describes the complete Wardwell line, which includes a wide variety of machines for sharpening woodworking saws; for metal cutting saws of medium, spring, or hard temper; for combination wood and metal cutting saws, etc. Wardwell also offers grinding wheels and files.

## New Murex A.-C. Rod

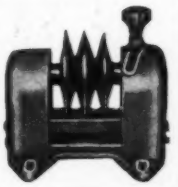
Metal & Thermit Corp., 120 Broadway, New York, N. Y., announces an addition to its line of Murex covered electrodes for manual arc welding. The new electrode, known as Murex Alternex, is designed especially for use with transformer type A.-C. welding equipment and is said to handle extremely well in all positions, including "vertical - down - welding." In the smaller sizes, it may also be used to advantage in welding light-gauge steel.

ALL SPEED VARI-SPEED TRANSMISSIONS

Are made in 3 sizes for use with ⅜-A-B Belts and ranges up to 12-1. They are easily adaptable to most speed control applications. The All-Speed is sturdily built and is low in cost.

The All-Speed Transmissions make ideal lathe and machine tool drives. Infinitely variable throughout a wide range.

*Write for information and quotation.*



Standard Transmission Equipment Co.
416 W. 8th St., Los Angeles, Cal.

# USEFUL

## In Any Modern Shop

This sturdy 36"x48" Milwaukee Surface Plate is of semi-steel construction, accurately machined, provided with cross ribs every 10½" for rigidity, securely mounted on cast legs which are machined and provided with SAE adjusting screws for perfect alignment. Height from floor to top of plate 30". Shipping weight 1200 lbs.

We also make larger and smaller plates either with planed or scraped surfaces whichever is desired.

*Write today for full information.*

**J. C. BUSCH COMPANY** ENGINEERS AND MACHINISTS SINCE 1907
165 SO. BARCLAY ST., MILWAUKEE, WIS.

# For AIRCRAFT and MUNITIONS

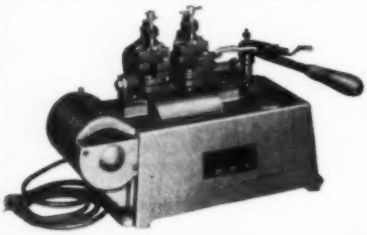
**1883**
**GREENERD**
**The Originators of the Arbor Press**
**1941**

## PRECISION WORK IN REARMAMENT

**65 Standard Styles and Sizes. Manually operated presses ¼ to 35 tons pressure. Motor driven hydraulic presses 1½ to 30 tons pressure.**

***Let us send you our catalog No. F.***

**GREENERD ARBOR PRESSES**
NASHUA Est. 1883 NEW HAMPSHIRE



**Weldex Welders**

The No. 141 Bench Type Band Saw Welder may be equipped with Grinder. Work can be annealed without removing from the Welder. Band saws up to ¾" wide may be welded.

1 KVA—110 Volt—60 Cycle—single phase—5 point heat control—1 point anneal heat—Weight 40 lbs.—write for further details.

**Weldex Inc.**

7325 McDonald Ave., Detroit, Mich.

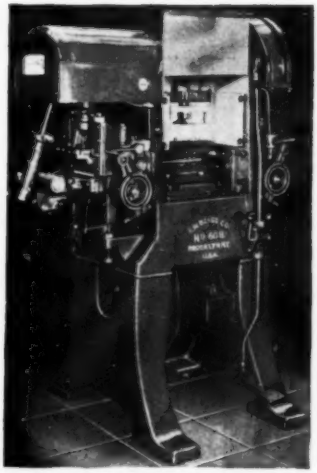
## High Speed Bliss Press

A new No. 608 high production press is said to be capable of speeds up to 1200 strokes per minute. It is explained that a heavy one piece frame cast from high test pearlitic iron, together with a light cast steel slide enables this press to run at such high speeds with stability.

Two steel connections and bronze lined gibbing of generous length help to maintain excellent alignment of the slide, for long die life. Electric detectors can be employed in connection with an electric protective trip. A few specifications follow:—

Distance, bed to slide with adjustment up, 7"; standard stroke ¼"; face of slide F to B x R to L 7" x 10"; 8 tons capacity.

Further details will be supplied by E. W. Bliss Co., 53rd St., and 2nd Ave., Brooklyn, N. Y.



*Why Not Buy The Original Electric Etcher?*

**MARK IRON AND STEEL**

**THE ETCHOGRAPH WAY**

New ELKONITE TIP pencil. New Baby Grand Model at a lower price.

**2,000 in use**

**BREWSTER - SQUIRES CO.**

42 Church St., New York, N. Y.

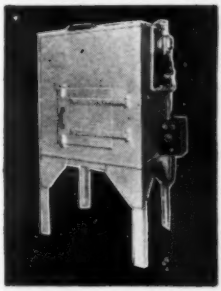
HELPING TO CUT THRU DEFENSE

# PRODUCTION SNAGS

DESPATCH *Tempering and Drawing Furnaces*

DESPATCH *Utility Furnaces*

Accurate Heat treating for dies, tools and Pre-heating aluminum... Forgings... Attain New Accuracy in production and testing work. New Uniformity will give laboratory accuracy to every load. New Flexibility will increase furnace usefulness in the tool room. New Economy to boost all around efficiency.



WRITE TODAY FOR BULLETIN NO. 83-C

## DESPATCH OVEN CO.

MFG. OF OVENS FOR COIL AND ARMATURE - CORE AND MOLD - CURING - DRYING - FINISH BAKING

MINNEAPOLIS MINNESOTA

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STURDIMATIC HEAVY DUTY

LIVE CENTERS

ARE

AUTOMATICALLY COMPENSATED FOR

EXPANSION SHOCK AND WEAR

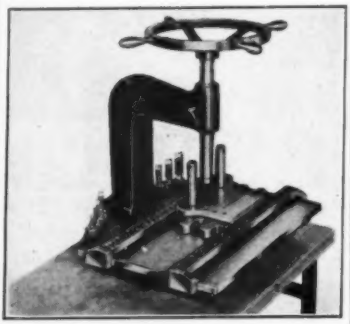
ARE ACCURATE DURABLE

WRITE FOR CATALOG AND FREE TRIAL OFFER

STURDIMATIC TOOL COMPANY

5224 THIRD AVE. DETROIT, MICH.

Save TIME TAPS TROUBLE with the New VIKING TAPPER



You save time because the Viking Tapper eliminates the wasting of valuable time by highly paid skilled men trying to tap holes accurately by hand. One fifth the time is required.

You save taps because tap breakage is practically done away with. This enables the use of high speed ground thread taps at lower cost than carbon taps. The savings on taps alone will pay for the tapper in a short time.

You save trouble because Viking Tappers take the trouble out of tapping.

For Precision Tool Room Tapping use the Viking Tapper. Capacity ¼" to ⅜".

*SEND FOR CIRCULAR*

**THE VIKING TOOL & MACHINE CORP.**

**14 MAIN St., BELLEVILLE, N. J.**

## Handy Ohm's Law Calculator

A convenient new Ohm's Law calculator is announced. It gives the answer to any Ohm's Law problem in a jiffy, with one setting of the slide. There are no decimal points to worry about. All values are direct reading. It does not require any knowledge of a slide rule to operate.

The calculator has scales on both sides and covers the range of currents, resistances, wattages and voltages commonly used in the Industrial, Electronic, and Radio fields. It covers the current and wattage range for motors, generators, lamps, electrical apparatus and other applications up to 100 amperes or 1000 watts; also the low current high resistance radio, sound and electronic applications.

The calculator is available to engineers, laboratory men, production managers, maintenance men, purchasing agents, etc. who write on company letterhead, giving name and position, enclosing 10c to cover handling cost, to the Ohmite Mfg. Co., 4835 Flournoy St., Chicago, Ill.

## Schauer Speed Lathes Catalog

A new 24-page illustrated catalog, No. 400 — shows and describes the complete line of high production, bench and pedestal speed lathes, especially designed for finishing, polishing, burring or lapping small parts—includes specifications — shows standard series also new variable-speed lathes and lathes with vacuum-type holding fixtures—issued by Schauer Machine Co., 2064 Reading Road, Cincinnati, O.

KUTMORE HIGH SPEED E

Adjustable Hollow Mills with Twoway Micrometer Adjustment Cutting capacities up to 2½".

*Ask for New Catalog*

**Reisinger Mfg. Company**

**837 Lake Ave., Rochester, N. Y.**

# "ABRASAW"

## BRIDGEPORT No. 47W
## Wet Cut-Off Machine

More, better and cheaper cuts on practically all materials, are produced by the new Bridgeport "ABRASAW". Cutting speeds are unbelievably fast, material is handled with facility and the polished cuts often eliminate secondary operations.

Capacity includes solids up to 2½" —tubing and light sections up to 3½" diameter.

*Let us send bulletin giving full details.*

**Bridgeport Safety Emery Wheel Co., Inc.**
**BRIDGEPORT, CONN.**

**TRY MAC-IT Alloy Steel SQUARE HEAD SET SCREWS**

Here's three times the gripping power of the same diameter hollow set screw! Where machines take terrific punishment, Mac-it square head sets are used because they offer amazing resistance to upsetting of the points and breakage.



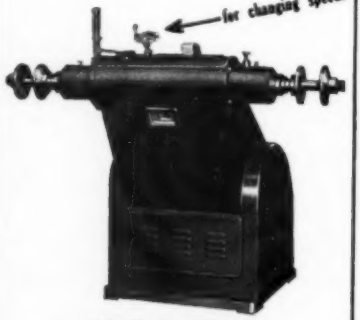
**FREE!** Write Dept. B for celluloid slide scale, giving all dimensions on standard Socket Head Cap Screws—Hollow Set Screws—Stripper Bolts. 4

THE STRONG, CARLISLE & HAMMOND COMPANY
1392 West Third St., Cleveland · Ohio

HAMMOND of KALAMAZOO

**POLISHERS**

1 to 50 H. P. Single or Variable Speeds.




**GRINDERS**

Tool, Production and Disc ¼ H. P. to 20 H. P.

Reduce your Grinding, Polishing and Buffing costs with Modern **HAMMOND** Equipment.

• **Pin** our **signature** to your letterhead for complete information.

Hammond Machinery Builders
KALAMAZOO, MICHIGAN, U. S. A.

**1614 DOUGLAS AVE.**

## Metal Cleaning Booklet

Prepared for works managers, production managers, plating supervisors and contract finishing shops is an interesting, illustrated, 32-page booklet outlining formulas and methods for cleaning many different metals and alloys before electro-plating just issued by Oakite Products, Inc., 57 Thames St., New York, N. Y.

It describes new and improved methods for safely cleaning aluminum, magnesium and their alloys before plating, anodizing or various other surface treatments used in connection with them; cleaning polished steel without pre-soaking or subsequent wiping or brushing operations; cleaning buffed brass, bronze and other copper alloys; cleaning iron and steel castings, zinc and zinc base alloy die castings, cold rolled steel, antimonial lead die castings and tin alloys. Considerable data is also included on such other operations as tumbling and burnishing, etching aluminum, reclaiming rusted parts, cleaning before pickling and eliminating water stains on plated work.

Supplementing all this information are many helpful hints on tank installations and other factors which, beyond use of proper cleaning material, may largely govern plating results and costs. Subjects discussed in this connection include still and electric cleaning tanks, sizes of steam coils required for heating tanks, rinsing facilities and control of cleaning solution concentration and temperature.

**WORK WANTED**

Recent expansion of a privately owned machine shop enables it to take on additional small and medium sized lathe, drill and milling machine work.

**BOX No. 146**

**c/o Hitchcock Publishing Co.**

**508 So. Dearborn St. Chicago, Ill.**

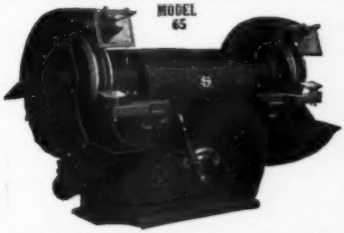
# EQUIPMENT

## Saves ITS COST MANY TIMES OVER!

Absolutely dependable electrical tools for every plant in which production must be speedy, accurate and economical.

### 4-SPEED SNAGGING GRINDERS

MODEL 65



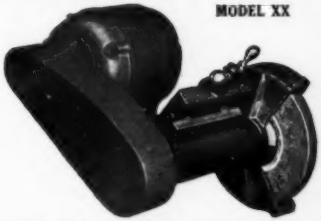
Gear drive transmission. For vitrified or high speed wheels. Others ¼ H. P. to 15 H. P.

### ¼ AUTOMATIC DRILLS

Ball bearing. Universal motor. ¼" to 2".

### PRECISION LATHE GRINDERS

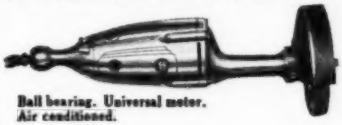
MODEL XX



For external or internal grinding. Interchangeable spindles. Others ¼ H. P. to 15 H. P.

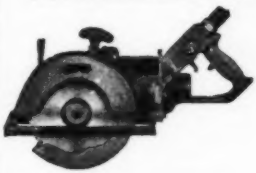
*Write for Catalog No. 56.*

### PORTABLE ELECTRIC GRINDERS



Ball bearing. Universal motor. Air conditioned.

### PORTABLE ELECTRIC SAWS



Adjustable foot base and bevel cutting device. 6" to 11".

### BUFFER AND POLISHER

MODEL 100

Belt drive. Single Spindle, overhanging for handling of large pieces. Others ¼ H. P. to 15 H. P.

## THE UNITED STATES ELECTRICAL TOOL CO.

THE GOOD MECHANIC'S CHOICE

CINCINNATI, OHIO, U.S.A.

## EXCELSIOR No. 14 ANGLE ROLLING MACHINE

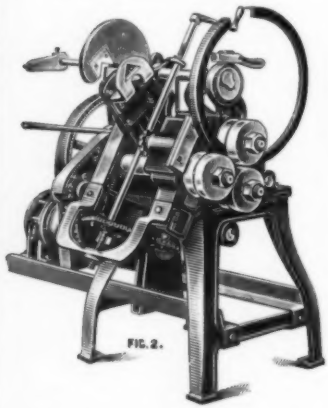


FIG. 2.

Capacity 2x2x¼" Angles. All the rolls are direct driven avoiding slipping of the material between rolls, which are operated by the oversize Excelsior friction clutch. Write for Price and Testimonials.

We specialize in Automatic Grinding and Polishing Machines, to polish Stainless Steel Sheets, Automobile Bumpers, and parts, Stove and Range Top Castings, Electric Iron Sole Plates, etc.

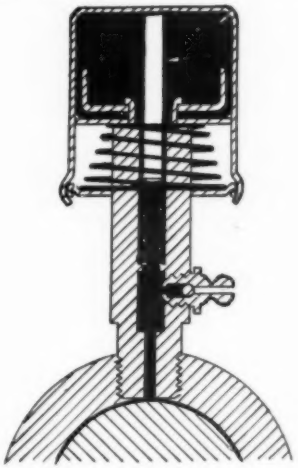
Also Inside Cutting Shears, Deep Throat Power Punches for duplicate work by the use of horse shoe templets up to No. 12 gauge. Used in Stove, Range, Air Conditioning and Kitchen Equipment Plants.

**EXCELSIOR TOOL & MACHINE CO.**

**East St. Louis, Illinois**


### An Automatic Grease Cup

A new type grease lubricator is announced by Ace Lubricating Equipment Co., Inc., 2345 W. Grand Blvd., Detroit, Mich. The Ace Automatic Lubricator, as it is called, indicates at a glance just when refilling is necessary.



When filled, the cup stands high. When empty it is down. Positions in between indicate how much grease remains in the cup. It is claimed that if grease should become caked, the cup can be cleaned and put back into service in a minute. The Ace lubricator is equipped with a safety valve which is said to prevent damage when it is filled with a high pressure gun. This self-feeding grease cup can be adjusted to suit bearing pressure and lubrication requirements by simply changing the feed spring.

### Two New Morey Bulletins

Two new descriptive folders have just been issued by the Morey Machinery Co., 410 Broome St., New York City. Circular No. 629 fully describes the Morey No. 2 High Speed Turret Lathe. Circular No. 680 gives full details of their No. 12M High Speed Vertical Profiler and Milling Machine.

# A Verson HYDRAULIC

## Deep Drawing at Wayne Works!

## INCREASES PRODUCTION 50%

This 850 ton Verson Hydraulic speed press, equipped with Verson-Hydro-Pneumatic cushions, a 42 in. adjustable stroke, 100 in. daylight space, a 95 in. x 144 in. bed area, produces 300 finished front deck bus panels per hour. Previously, production on this part was restricted to 200 pieces per hour with other equipment.

The drawing of 18 in. deep rear compartment sections, measuring 69"x76" finished, are produced at the rate of 150 per hour.

Here is another example of how Verson products have helped manufacturers increase production—improve products and lower costs.

Why not let a Verson engineer go over your problems with you? There is no obligation.

**Verson PRODUCTS**

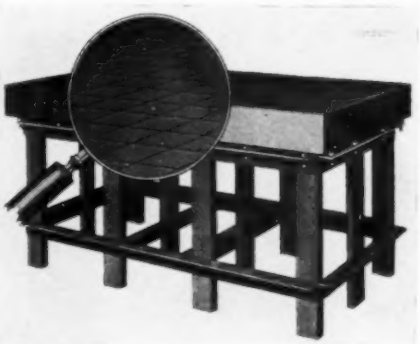
*POWER PRESSES*
*HYDRAULIC PRESSES*
*CLUTCHES*
*FORGING PRESSES*
*PRESS BRAKES*
*DIE CUSHIONS*

●

**VERSON ALLSTEEL PRESS COMPANY**

9303 South Kenwood Ave. • Sold Through Leading Machinery Dealers • Chicago, Ill.

## Challenge Lapping Plates



To provide a means for accurate lapping of delicate joints, The Challenge Machinery Co., Grand Haven, Mich., has designed a semi-steel lapping plate which has ⅛" grooves, spaced ½" apart, running the full length and width of the surface.

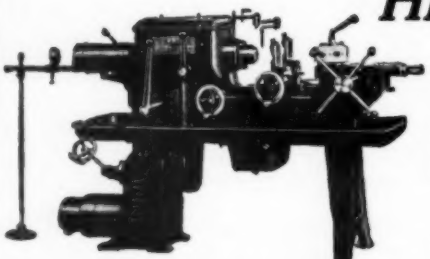
Joints required to hold oil can be lapped properly through the use of this plate, which is specifically designed to assure a perfect fit when lapping-in metal-to-metal joints on which no gaskets, shellac, or sealer of any kind are used.

Challenge Semi-Steel Lapping Plates are made of high-grade semi-steel, specially heat-treated and machined. They are used on crank cases, cylinder heads, end bells, gear housings, and other parts that must be perfectly lapped to avoid oil leaks.

A specially-designed, all-steel stand is available with these lapping plates. It is arc-welded for rigidity and strength and is equipped with closely-spaced lock leveling screws that enable the user to keep the lapping plate level at all times.

Challenge Semi-Steel Lapping Plates are built in a wide variety of standard sizes, ranging from 8"x8" to 52"x144". Special sizes are built to order.


# HERE IT IS!



The new SIMMONS No. 2 (1¼") Turret Screw Machine offered to you with *three* distinct advantages:

- Low Cost
- High Precision
- Quick Delivery

The SIMMONS Micro-Speed Drive, equipped with push-button control and magnetic brake, offers a range of spindle speeds up to 1,500 RPM. The operator can select the speed best-suited by a mere turn of a hand wheel.

Spindle mounted on Timken Precision Tapered Roller Bearings. Levers within immediate reach of operator. Head cast solid with bed, insuring rigidity.

***Write to-day for complete details.***

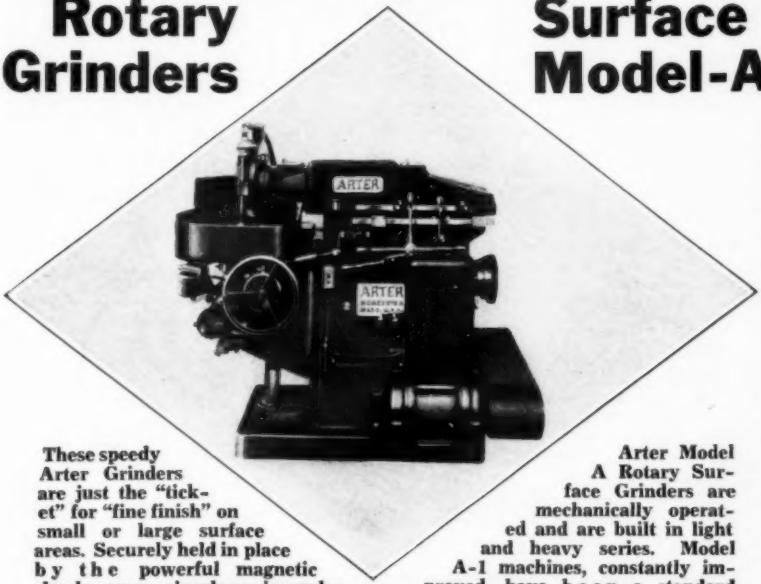
**SIMMONS MACHINE TOOL CORP.**

1725 Broadway, Albany, N. Y. Singer Bldg., New York City

ARTER

# Rotary Grinders

# Surface Model-A




These speedy Arter Grinders are just the "ticket" for "fine finish" on small or large surface areas. Securely held in place by the powerful magnetic chuck, square, circular or irregular shapes are precision ground. In addition to their great swing capacity, they have an unusual vertical capacity. Arter accuracy is assured by the one piece casting of the bed, the sturdy wheel slide and knee. These features mean sustained accuracy and low maintenance.

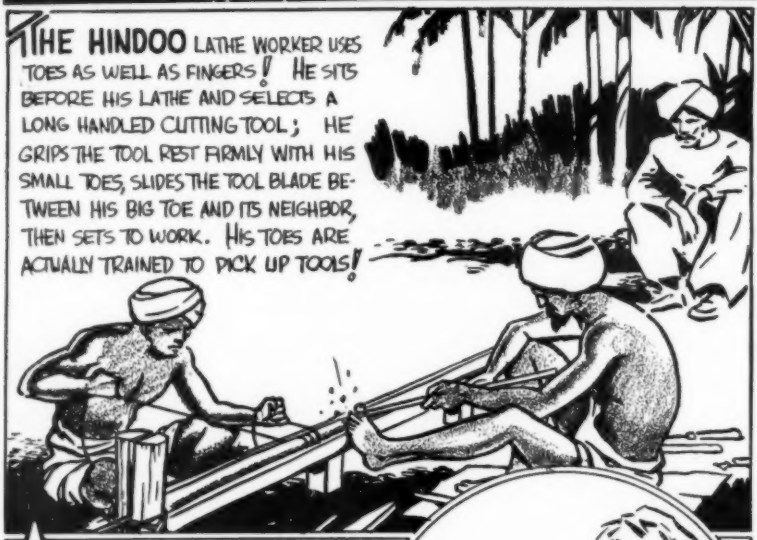
Let us tell you why Arter Machines mean lasting precision, greater versatility and higher capacity on your production grinding jobs.

Arter Model A Rotary Surface Grinders are mechanically operated and are built in light and heavy series. Model A-1 machines, constantly improved, have been a standard product for nearly 25 years for tool room or light production work. Model A-3 machines, of heavier proportions, have been progressively developed over a period of years to meet the modern demands for close limit work on volume production. Model A-1 machines are offered in 8" and 12" sizes, A-3 machines in 12" and 16" sizes. For grinding larger diameters Arter offers Model B machines. These are hydraulically operated and made in diametrical capacities of 20"-24"-30"-40".

## ARTER GRINDING MACHINE CO.

WORCESTER MASSACHUSETTS

# Mechanics Through the Ages

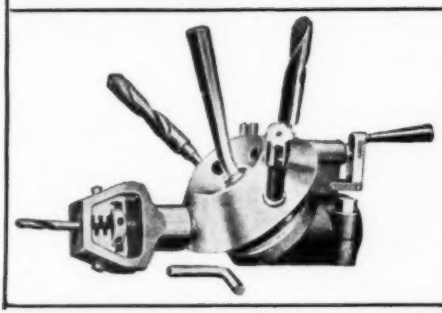


THE HINDOO LATHE WORKER USES TOES AS WELL AS FINGERS! HE SITS BEFORE HIS LATHE AND SELECTS A LONG HANDLED CUTTING TOOL; HE GRIPS THE TOOL REST FIRMLY WITH HIS SMALL TOES, SLIDES THE TOOL BLADE BETWEEN HIS BIG TOE AND ITS NEIGHBOR, THEN SETS TO WORK. HIS TOES ARE ACTUALLY TRAINED TO PICK UP TOOLS!

AS LATE AS 1881, THE GLASS AND CHINA MENDERS OF ENGLAND WERE USING THIS ANCIENT CHINESE "PUMP" DRILL TO PIERCE HOLES FOR THE INSERTION OF SMALL METAL RIVETS.

SO INACCURATE WERE THE BOXWOOD RULES COMMONLY RELIED UPON IN SHOPS OF THE MID-1800'S, THAT DRAWINGS COULD NOT BE EXACTLY FOLLOWED. IT WAS COMMON PRACTICE TO LEAVE DETAILS LARGER THAN INDICATED SIZES, THEN LABORIOUSLY FIT ONE PIECE TO ANOTHER ALL THE WAY THROUGH.

# A TIME SAVING TOOL



*Jefferson*

## TAIL STOCK TURRET

In fifteen seconds your present lathe can be converted into an efficient, dependable turret lathe. This rotary Tail Stock Turret accommodates five tools. The attachment is extra rigid and built in 3 sizes to withstand the same strain as the tail stock of any lathe. Once set, each tool automatically centers when brought into play.

Other time and money saving tools manufactured by JEFFERSON are the Tool Post Turret, Adjustable Pull feed, Swing Frame Grinder, Endless Belt Sander and Gyratory Sand Riddle.

*Let us tell you more about these modern aids to production. No obligation, of course.*

**IMMEDIATE DELIVERY**

## JEFFERSON MACHINE TOOL CO.

**700 W. FOURTH ST.** **CINCINNATI, O.**

UNBRAKO

Reg. U. S. Pat. Off.

**SELF-LOCKING SET SCREWS With the Knurled Points**

*You can count on them to hold tight!*

★ ★ ★ "Unbrako" Knurled Point Self-Locking Socket Set Screws just grab hold and grip . . . they stay set despite constant and severe vibration! Yet the knurled points which automatically lock the screws into place offer no extra resistance when setting up, adjusting or removing, and the "Unbrako" can be used over again, indefinitely. ★ ★ ★

*They're worth investigation immediately!*

## STANDARD PRESSED STEEL CO.

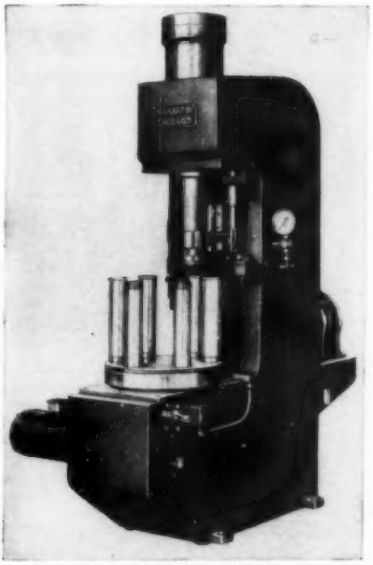
JENKINTOWN, PENNA. Box 850

— BRANCHES —

Pat'd. BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO Pat'd.

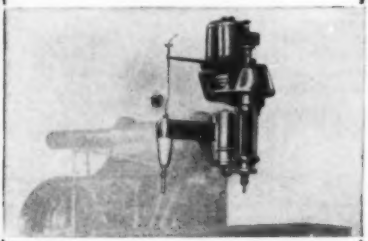
## 20-Ton Shell Marking Press

Hannifin Mfg., Co., 621-631 South Kolmar Ave., Chicago, has recently completed several hydraulic presses designed for marking 75 mm. shell casings and operating with a rapid, automatic cycle of approximately 4 seconds. Capacity of the press illustrated is 20 tons. A 10-ton model of similar design is available.



The ram is fitted with a marking die, and when once started, operates continuously, with automatic reversal at top of stroke, and automatic reversal governed by maximum pressure at bottom of stroke. The pressure governed reversal at end of working stroke insures uniform maximum pressure being exerted on the die, and uniform mark-


**HYDRAULIC DUPLICATING ATTACHMENT**

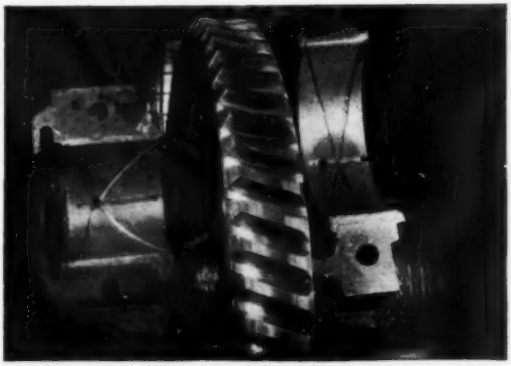


The Model No. 3C Hydraulic Duplicating Attachment as applied to Rainey High Speed Head. May also be applied to Ecklin and Bridgeport High Speed Heads. Die capacity 18". The width depending on the cross travel of the machine duplicates within .002. The price of Duplicating Attachments complete $545. Hydraulic Duplicating Attachments for Boring Mills, Lathes and Special Machines.

**Duplicating Attachment Co.**
852 Clair Point Detroit, Mich.

OPEN CLOSED TRADE AUTOM MARK CLOSED OPEN
Plain Type Offset Type
**CONTINUOUS HINGES**
All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.
**AUTO MOULDING & MFG. CO.**
2326 S. CANAL ST
CHICAGO
SPECIFICATIONS:
Open Width 1/8" to 6"
Gage Material .040 to .125
Pin Diameter .101 to 3/16
Lengths to 120"
THREE-FOURTHS OFFSET
SEMI-OFFSET

## Ideal Lubrication—Quiet Operation
WITH
## TIMESAVER LAPPING COMPOUND



A scientific lapping compound especially prepared for the precise fitting of all types of Gears, Bearings, Pistons, Slides and valves.

Elevator Gear and Bearings lapped with Timesaver Compound.

TIMESAVER COMPOUND will not imbed into any metal or continue to cut. Grades for hard and soft metals.

*Send for Free Sample and Literature on your Letterhead*

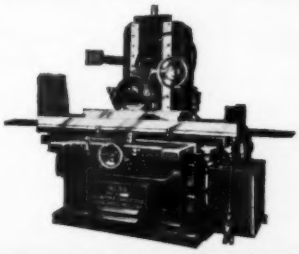
**TIMESAVER PRODUCTS CO.,** 33 S. Desplaines St., Chicago, Ill.

## SPEED & PRECISION
with
## Grand Rapids Hydraulic Feed Surface Grinders

While keeping pace with the Defense Program Grand Rapids Grinders are maintaining the features that have made them one of the leading machine tools of the Nation.

One piece base and column insure accuracy at high speeds attainable on all Grand Rapids Grinders.

*Write for Catalog GL-100*



**GALLMEYER & LIVINGSTON CO.**
405 STRAIGHT AVE., S. W. • GRAND RAPIDS, MICHIGAN

ing. Both maximum pressure and stroke of ram are adjustable. Adjustment of length of stroke avoids unnecessary up-travel of ram and allows varying cycle of operation if desired.

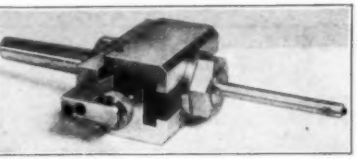
An electrical control actuated by ram on return stroke operates the indexing table. The circular table is equipped with six mandrels. The table indexing mechanism runs in oil, and is driven by a ¾ h.p., motor with electric brake, automatically controlled to advance table on position with each return stroke of ram. The operator has only to start press, and load and unload fixture as table advances. The press will operate at a maximum rate of 15 cycles per minute.

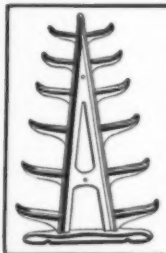
A motor driven hydraulic power unit is built into rear of press, providing a self-contained unit requiring only electrical connections to complete the installation. The press frame, table support, and power unit mounting are of Hannifin welded steel construction, providing simple, rugged construction and smooth exterior.

This type of indexing press is also adapted to many other operations requiring the application of pressure.

## Russell Boring Bars

A handy line of boring bars is presented by Russell Boring Bar Co., Middletown, Ohio. Featuring quick micrometer adjustment and positive locking, these bars may be used in milling machines, drill presses, boring machines and lathes for a broad range of boring jobs.



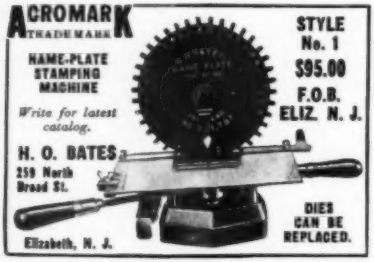
"CHAMPION" Steel Racks

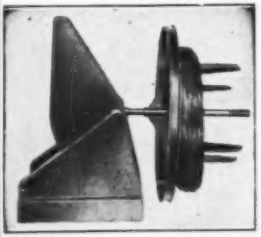
Save time, steps and money by keeping bar stock, shafting and pipe out of the way and off the floor.

*Write for full details.*

The Western Tool & Mfg. Co.
Springfield, Ohio

ACROMARK TRADE MARK
NAME-PLATE STAMPING MACHINE
*Write for latest catalog.*
H. O. BATES
259 North Broad St.
Elizabeth, N. J.
STYLE No. 1
$95.00
F.O.B. ELIZ. N. J.
DIES CAN BE REPLACED.





PRODUCTION MINDED EXECUTIVES TURN TO "SHIFTWEIGHT" WIRE REELS!
TO SAVE MAN HOURS!
TO AVOID SHUTDOWNS!
TO SPEED PRODUCTION!
WHEREVER WIRE IS HANDLED FROM REELS "SHIFTWEIGHTS" CAN DO THE JOB—BETTER!
* ONE MAN LOADING * 300 POUND CAPACITY * SNARLPROOF
* NO BOLTING TO FLOOR * WELDED STEEL CONSTRUCTION
* FULL ADJUSTMENTS
*WRITE FOR COMPLETE INFORMATION*
MOSLO MACHINERY INCORPORATED
5005 EUCLID AVENUE CLEVELAND, OHIO
*DEALERS' INQUIRIES INVITED*

★ MARSCHKE

**For Dependable Heavy Duty Service**

**GRINDERS**

1 to 25 HP—10" to 30" Wheels—Bench and Pedestal—Narrow and Wide Types—Constant Cutting Speed and AC Multiple Speed Stand Grinders.

**SWING FRAME GRINDERS**

3 to 15 HP—12" to 24" Wheels.

**BUFFERS**

1 to 15 HP—Direct Drive—Selective Speed—Independent Spindle.

*Automatic adjustment of wheel guards make MARSCHKE Grinders extra safe.*

*Write now for Bulletin on the quality MARSCHKE Line to*

**VONNEGUT MOULDER CORPORATION**

**1805 Madison Ave., Indianapolis, Ind.**

*Small Things to do that will Help you Avoid Headaches*

**Order that Next Lot of Jig Bushings from ACME**

*Because—*

**You can choose from a complete stock of both A. S. A. and Acme Standards.**

**They are easy to select from our catalog.**

**They arrive promptly and thus avoid delays in your shop.**

*Catalog on request.*

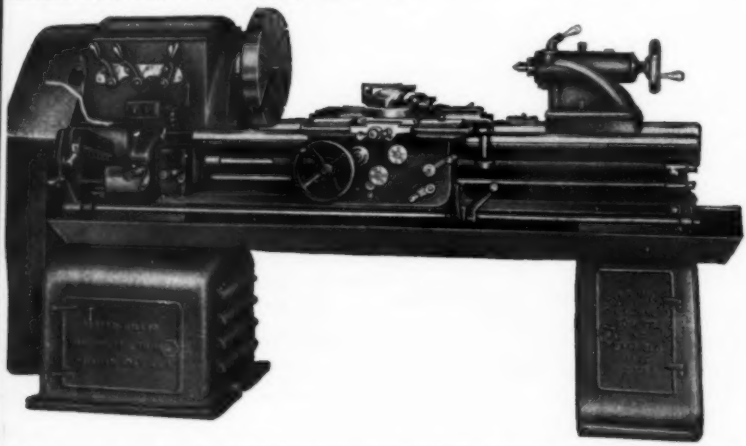
**ACME INDUSTRIAL COMPANY**

**210 N. Laflin St., Chicago, Ill. MONroe 4122**

ACME

## Porter-McLeod Announces New Lathe Model

A new 16" 12-speed geared head uick change, screw cutting engine the is announced by Porter-McLeod fachine Tool Co., Inc., Hatfield, Mass.



There are many advanced features. Headstock is a full box section with ubstantial internal ribbing for rigidity nd strength. All speed changes are elective and are made inside the head-ock.

The forged chrome nickel steel spin-le is mounted on Timken roller bear-ngs. Motors are regularly mounted nside cabinet legs and connected by elts or chain drives.

Beds are of sturdy semi steel castings. Carriage is 7½" across the bed, providing a rigid foundation for the tools. Tail spindle is 2¼" in diameter and graduated. A chasing dial is provided which allows the operator to catch any thread at beginning of each successive cut.

Feed rod is equipped with adjustable automatic stop.

The quick change gear box is a unit mechanism bolted on to bed. All gears and clutches are of steel, being made from bar or forgings. Parts are sufficiently rugged, it is stated, to make all feed changes possible while lathe is running under cut. No gears are running on studs, all shafts being supported on both ends, 40 different positive feeds are available for turning.

**The NEDCO SANDING AND POLISHING MACHINES**

**Portable Electric—A.C. or D.C.—110 or 220 volts**

**CUTS COSTS! SPEEDS PRODUCTION!**

***"Minimum weight with maximum power"***

All types—Light Duty—Heavy Duty
High Speed—Low Speed
Rotary Disc—Reciprocating
For Machine Shop, Foundry, General Industry. Let a "NEDCO" solve your sanding problems. *Send us your inquiry today.*

Model "R" The New Nedco Electric Reciprocating Single Pad Sander or Filler Rubber, wt. 6 lbs.

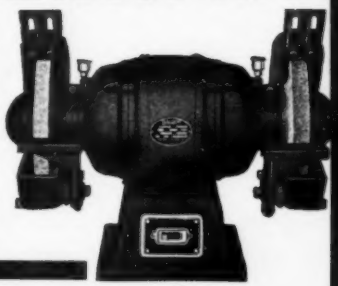
**The NEDCO Company, Waltham, Mass.**

# BALDOR
## BALL BEARING GRINDERS

*for*
HEAVY PRODUCTIO
WORK

## Xtra Heavy AND Excess H. P.

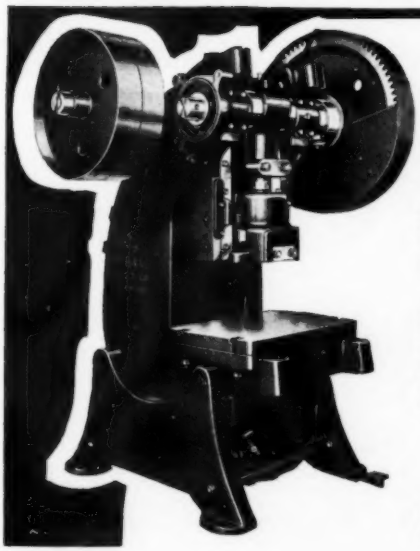
A powerful, heavy-duty 10" Grinder. Heavier and more H. P. than usual for it's wheel size. 1½ h. p., 3-phase motor; 220 volts, 60 cy., 1725 r. p. m. 10"x1" wheels. NET WEIGHT, bench type, 155 lbs. (Also available in pedestal type) 1-YEAR GUARANTEE.



**No. 101 — Bench Type — $84.00**

ASK FOR BULLETIN 67 ON COMPLETE LINE

**BALDOR ELECTRIC COMPANY**
4368 DUNCAN AVE., ST. LOUIS, MO.



# FEDERAL
## *Built for Service*
# PRESSES

Rigidity and long life are outstanding characteristics of Federal Presses, yet they are precision built throughout. On the ram action, for example, the tolerance is only .0015"

Federal Built-for-Service Presses are all equipped with Timken roller bearings for smooth operation and lowest maintenance costs. Federals are safer in many ways—safety latch spring, patented non-repeat clutch mechanism, etc.

*Write today for descriptive bulletin.*

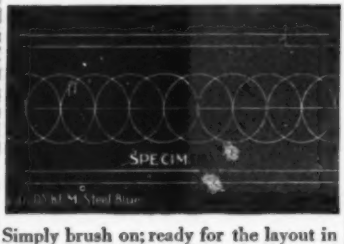
**FEDERAL PRESS CO**
ELKHART INDIANA

SHEAR CUT - HIGH SPEED
END MILLS

Shear Cut End Mills are offered in all standard sizes, single and double end. Write today for catalog and prices.

Progressive Tool & Cutter Co.
2345 Wolcott St., Ferndale, Mich.

DYKEM STEEL BLUE
STOPS LOSSES
*making dies & templates*




Simply brush on; ready for the layout in a few minutes. The dark blue background makes the layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy. *Write for full information.*

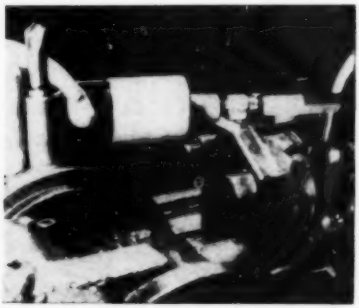
THE DYKEM COMPANY
2301 G North 11th ST., ST LOUIS, MO.
(In Canada: 3194 Dundas St. West, Toronto, Ont.)

Swing over bed is 17″, over carriage, 11½″. Distance between centers (6′ bed tailstock flush) 36″—(with tailstock overhung, 40″).

There are 12 spindle speeds, ranging from 15 to 500 r.p.m. Full details are given in a new bulletin.

## Diamond Lap Hones

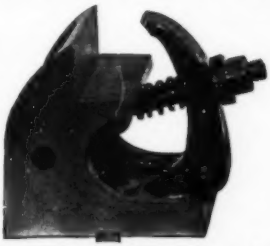
In production operations where cemented carbide tools are used, the cutting edge often becomes rough and it is necessary either to tear down the job and regrind the tool or touch-it-up by hand. The short reciprocating



stroke of the Multi-Purpose Tool (two models 7/16″ and ⅛″ stroke) makes it practical to get in anywhere you can by hand, and equipped with a diamond hone is said to effect time saving over hand lapping of carbide tips, often increasing production upwards of 30% before it is necessary to regrind the cutting edge.

The diamond-laps come in any grit required, from rough-cut to 500 grit, set 1/32″ or 1/16″ thick and 1″ long on the face of the lap. The tool is manufactured by the H & H Research Co., Detroit and with its short reciprocating stroke, is particularly adapted to taking off the last thousandths in die sinking, pattern, tool and plastic mold making and any delicate, accurate work of which this carbide tip touch-up is typical. Powered with a 110 volt universal motor, it files burrs, hones chips and saws, developing a six to 12 pound push at head of tool.

## HART'S MILLING FIXTURES



These fixtures will make themselves popular and profitable in your shop. They are easily kept clean to receive the work and may be used in either horizontal or vertical position. Suitable to hold round, hexagonal, octagonal, or square stock, aligning the work with the machine. A very easy setup and fool proof, with a grip that holds the work on the bottom as well as on the back. Shipped in pairs, unless otherwise ordered. Made in 4 sizes—$\frac{3}{4}$" to 4". We can also supply dividing heads to be used with the fixtures.

Write for descriptive circular.

**HART MACHINE CO.**
26 Mather St., Dorchester, Boston, Mass.

## for ELECTRIC AND AIR HAND DRILLS

## Precision COLLET CHUCK

Makes stub drill of Jobbers Drill
Less Drill Breakage
Quicker, more accurate
Grips on Flutes as well as on the Shank
Grips on 8 points instead of customary 3 or 4.
Collet collapses 1/32" Chuck Shank supplied for any type spindle — male or female. Sizes, 1/4" Dia. to No. 80 Drill.
Patents Pending
COLLET
Send for new Bulletin

**ERICKSON STEEL CO.**
80th & BESSEMER CLEVELAND, OHIO

## Is Cutting-off a "Bottleneck" with You?

- Eliminate this bottleneck and reduce cutting-off time. Prevent the losses you now have in sharpening time itself, time consumed in removing and inserting, the time required to reset blade in relationship to other tools and the work.
- This cutting-off tool reduces grinding time because of proper clearance provided at all points. Blade comes ready to use, and re-sharpening is necessary on the front face only.
- You get longer blade life, because the only friction comes from the cutting action— the concave top of blade curls the chips which cannot bind in the cut— the blade requires less grinding— there is less breakage.
- The result is increased, uninterrupted production and finer finishes.

Produced under license issued by John Milton Luers Patents Inc.

Here's Your Solution

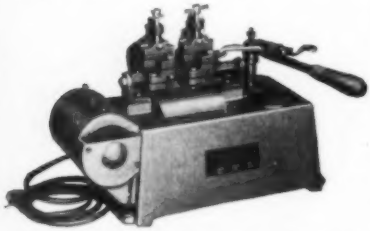
*Write for full information and Illustrated Literature.*

Tell us the make and size of your equipment, and our engineers will make recommendations.

**EMPIRE TOOL CO.** 8790 GRINNELL AVE. DETROIT, MICHIGAN

## Weldex Band Saw Welder

An interesting item in the complete line of Weldex welders is the new No. 141, 1 KVA. bench type Band Saw Welder. It can be supplied with or without grinder, and provides 5-point heat control, with a single point for annealing work without removal from the welder. It welds band saws up to ¾" wide.



The line includes many other types of precision welders for light gauge metals, with air pressure and electronic control. Special welders are built to order.

Address Weldex, Inc., 7324 McDonald Ave., Detroit, Mich., for full details.

**The GEMCO KEYSEATER**

**Bench and Floor Type**

This inexpensive compact Keyseater will accurately do the work of a high priced power-driven machine. It will cut Keyways ½" to 2⅞" bore as standard; or if desired larger bores can be arranged. Keyways up to 7" in length, either straight or taper can be made.

***The Following Cutters Are Standard on THE GEMCO***

With the ½" bar: 1/16" and 3/16" Cutters.
With the ¾" bar: 3/16", 1/4" and 5/16" Cutters.
With the 1" bar: 1/4", 5/16", 3/8", 7/16" and ½" Cutters.

Cutters also in thirty-second sizes.

***Write for sizes, prices and information.***

**GIBRALTAR EQUIPMENT & MFG. CO.**
**Madison at 14th St. - - St. Louis, Missouri**


## Improved Metal-Cutting Alloy

"Haynes Stellite" Star J-Metal is the latest cobalt-chromium-tungsten metal-cutting alloy announced. Thorough and extensive tests on production jobs are said to have proved the new tools to be a substantial improvement over the former, standard grade of J-Metal tools in life between grinds. Star J-Metal is recommended for all machining operations now being performed with the original J-Metal tools—on cast iron, semi-steel, steel, or other materials. The new tools can be operated under the same conditions as the original grade and are ground with the same wheels, at the same wheel speeds and feeds. In some cases, the improved cutting quality is said to make higher cutting speeds and feeds possible.

Because of all this, the new metal replaces the old grade of J-Metal tools and is now available in all standard tool bit sizes, both squares and flats, and in the many standard and special blade designs and sizes; also in the form of standard welded tip tools and in the many special tool designs for grooving, cutting off, counterboring, spot facing, form cutting, core drilling, etc. Prices remain the same as for the original J-Metal tools and full details are available from Haynes Stellite Co., Kokomo, Ind.

## Barker Wrenchless Chuck

Catalog 4-A presents the Barker Wrench-less Chucks which can be adapted to any type of work that may be done on turrets, engine lathes, semi-automatics, pipe threading and cutting-off machines. They require no accessories to install, and a quick movement of the lever releases or grips the work. Are well adapted for a widely diversified line from small brass castings to heavy forgings. Two and three jaw models are available in a variety of sizes and full details may be obtained from Thomas Hoist Co., Chuck Division, 24 So. Hoyne Ave., Chicago, Ill.

**PRODUCTIMETERS**

**STROKE**

***counters***

**FOR**

PUNCH PRESSES
SCREW MACHINES
DRILL PRESSES
CONVEYORS
SHEARS — SCALES

***Equip Your Machines***

Model 5-H-1 for Heavy Duty
Model 5-D-1 for Light Duty

Over 100 Models to choose from . . . Stroke, Rotary, Lineal, Pre-determined, Electric . . . Ask for BULLETIN No. 7 and indicate style of counter that interests you.

**DURANT MANUFACTURING CO.**

1928 N. Buffum St. Milwaukee, Wis.
180 Eddy Street Providence, R. I.

# A CLAMP for Every Purpose

Forged Steel
Quick Acting
Deep Reach
Welders

Sizes Available:
¾" to 10' opening
½" to 16" deep

Write for CATALOG and PRICES on Clamps for all purposes as well as many other tools for use in the Machine Shop.

IN STOCK AT YOUR SUPPLY HOUSE

**The Cincinnati Tool Co.,** 1945 WAVERLY AVE., CINCINNATI, OHIO

## Machining Die Castings

An interesting new 32-page bulletin on Practice in Machining Zinc Die Castings is offered by The New Jersey Zinc Co., 160 Front St., New York, N. Y. Actually it is an enlarged second edition of a previous publication under the same name and it includes many new photographs of practical commercial fixtures and machining methods. Everybody who works with die castings will find this bulletin helpful.

*Have you our Engineering Data Sheets on the new line of*

**BABY GUSHER**

**Machine Tool Coolant Pumps?**

Made in four types; 1/30 and 1/10 h. p. for small machine tools and machines requiring from 4 to 10 G. P. M.

*Write for descriptive literature.*

**The Ruthman Machinery Co.**

**203 Pike St., Cincinnati, Ohio**



**THE PRECISION UNIVERSAL TOOL HEAD**

brings all adjustments under absolute micrometric control of the operator without stopping tool or machine. In Jig Borer, Milling Machine or Horizontal Boring Mill, it bores, faces, counterbores, turns outside diameters, mills flat surfaces and slots, under-cuts, recesses, back-faces and does an almost limitless range of "headache" jobs. Send for bulletins. Address all communications, inquiries and orders to

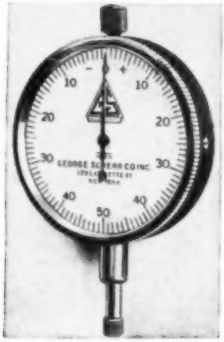
**THE PRECISION TOOL COMPANY**

**P. O. BOX 155, BROOKLYN, NEW YORK**

Cable Address: "Pretool-New York" Tel: MAin 4-1064


## "GS" Dial Test Indicator

Instead of the usual rotating multiple gear and pinion trains, the new "GS" indicator utilizes a lever arm and is constructed on the principle that the simpler the mechanism, the greater will be the accuracy and durability of the tool.




The dial is graduated in 1/1000" with a plunger travel of 3/16". The indicator can be supplied with universal ball joint back which permits a wide range of indicator settings on all types of machines. The indicator movement is mounted between separate top and bottom plates and the hair spring is between two flat plates and cannot interfere with the lever rack.

Full information in a new bulletin, may be obtained from the George Scherr Co., 122 Lafayette St., New York, N. Y.

**1941**

**SILVER KING BULLDOZERS**

Reduce your fuel Handling costs with a Silver King Bulldozer Unit. It combines fuel economy at **one gallon per hour** moving **35 tons** of coal **per hour.**

Bulldozer Plow is equipped with hydraulic lift and full safety devices.

Same tractor can be used for other various jobs around your plant. A demonstration can be conveniently arranged.

**CULLMAN SALES CO.**

**154 Nassau St., New York City, N. Y.**

# THE NEW LINLEY

**High Speed Vertical Milling Machine and Jig Borer.**

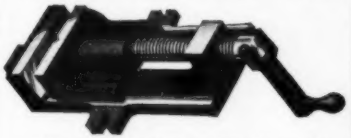
Unsurpassed for small work. Has new direct reading micrometer screw feed quill. Makes accurate, quick cuts at any predetermined depth to 3".

*Write today for descriptive Circular B.*

**LINLEY BROTHERS CO.**

11 Montauk St., Bridgeport, Conn.

# YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

| Vise No. | Width of Jaw, Inches | Opens Inches | Weight Pounds |
|---|---|---|---|
| 1D | 3½ | 3½ | 12½ |
| 2D | 5 | 5½ | 23 |

Do you need a vise of ANY type?

*Write today for bulletins on the extensive Yost line*

**YOST MFG. COMPANY**

1335 SO. MAIN ST.

MEADVILLE, PENNSYLVANIA

# NEW EASY WAY TO CUT SANDING COSTS 25 TO 75%

## ONE HAND DOES THE WORK OF THREE!

At last, sanding has been mechanized! No more laborious, time-eating hand-sanding. Sterling's portable Speed-Bloc Sander now enables one man to do the work of three. It speeds up production, cuts labor and abrasive costs from 25 to 75% and increases profits. Soon pays for itself.

Easy to operate—one hand guides the Sterling. No surface stumps it—metal, wood or composition. Sands wet or dry, rubs and finishes flat or curved surfaces; sands filler coats; "feathers" spot jobs; removes burrs.

*Sterling* SPEED-BLOC SANDER

*WRITE FOR FULL DETAILS NOW!*

*Sterling* TOOL PRODUCTS COMPANY

357 EAST OHIO STREET

CHICAGO, ILLINOIS

# Save on Small Parts

Leave your large presses free for big jobs.

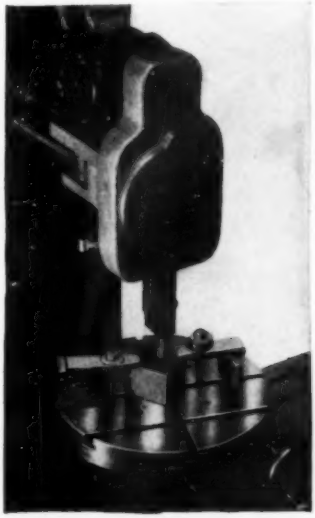
Rousselle Punch Presses feature Automatic Knockout Bar and Non-repeating Clutch—your assurance of real safety and convenience.

*Let us tell you how to cut press operating costs.*

**DAVID J. ROSS CO.**
**BENTON HARBOR, MICHIGAN**


## Universal Slotting Head

A useful new high speed universal Slotting Head has been developed by Experimental Tool & Die Co., Special Machinery Division "B", 12605 Greiner Ave., Detroit, Mich. It may be used



on practically all types of milling machines through the use of mounting adapters to suit the application.

The housing is cast, polished aluminum and working parts are of graphitic steel, heat treated and ground. Preloaded Timken roller bearings are used throughout. Gears and racks are hardened and ground. Moving parts are enclosed.

The head is equipped with a ¼ h.p. motor and there are 4 speed changes, ranging from 50 to 250 strokes per minute, or 100 to 580 strokes per minute. Ram stroke is readily adjustable from 0 to 4".

Tool holder is of the clapper-box type and may be turned in any position required.

Overall length is 18", width 8" and depth 12".

# NICHOLSON CONTROL VALVES

are made in two, three and four-way types for air, oil, water, steam, gas, etc., pressures to 5000 lbs. Style E is a general purpose valve for pressures to 300 lbs. Various metal combinations to suit any medium. Style J is for air and oil only, pressures to 125 lbs. Style H is a balanced hydraulic valve for pressures to 5000 lbs. We also manufacture foot, solenoid and motor-operated valves.

Style J

Style E

Style H

*Bulletins on request.*

*OTHER NICHOLSON PRODUCTS: Mandrels, Arbor Presses, Flexible Couplings, Steel and Stainless Steel Floats, Steam Separators, Steam Traps, Air Separators, Air Traps, Air Vents, Etc.*

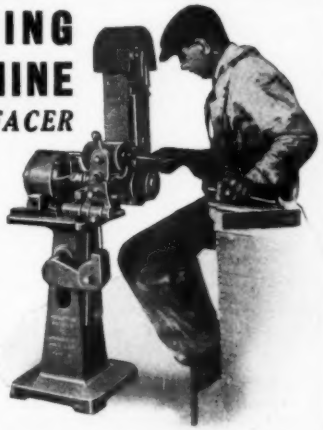
## W. H. Nicholson & Company

117 OREGON STREET WILKES-BARRE, PA.

# A BIG LABOR SAVING PRODUCTION MACHINE

## *TYPE S POLISHER & SURFACER*

Combining a centerless feed polishing machine—a vertical or horizontal belt grinder—surfacer or polisher, and an internal grinder or polisher, the Type S is remarkably versatile. Suitable for metal, rubber, fibre, wood or anything that can be ground or polished, it has no equal for cylindrical polishing or straight line finishing on flat work. Can be changed for hand feed and from vertical to horizontal in few seconds. Cylindrical work ¼" to 1" in diameter may be fed automatically without centering or chucking.



Other Types—Also Reed High Speed Sensitive Drills.

*Send TODAY for bulletin giving full details.*

**PRODUCTION MACHINE CO.**

GREENFIELD, MASSACHUSETTS

Here's a General Utility Tool at the Price You Want to Pay!

New STOW JUNIOR

Flexible Shaft Machines

Four Types To Choose from
Pedestal—Combination
Suspended—Multi-Speed
Full Line of Attachments
Prices as low as $35.00 F. O. B. Factory

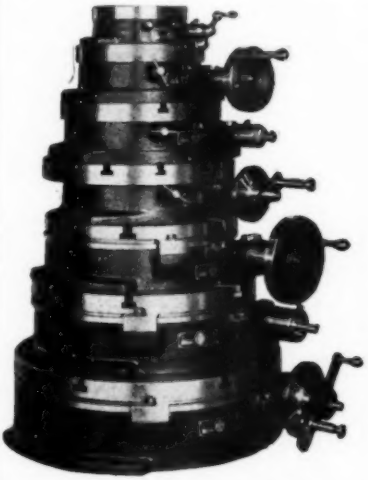
This easily portable machine does hundreds of different jobs . . . saving in time and labor . . . saving also in investment over costlier production-type machines. Takes the tool to the work; avoids carrying work to the tool. With its many useful attachments, STOW Junior has all-around adaptability for grinding, filing, wire-brushing, polishing, buffing and drilling . . . at surprisingly low operating cost and upkeep. *Write for FULL description and technical data TODAY!*

COMPARE This Quality
*Rugged oversized flexible core; tough, oil-resistant rubber outside casing. *Motor-end of shaft reinforced. Oilite bearings. *Handpiece: ball bearings. Removable clamp spindle. ALSO Available—Heavy-Duty Models.

STOW MANUFACTURING CO., INC.
30 Shear St., Binghamton, N.Y.
Established 1875 Inventors of Flexible Shafts

## Troyke Expands Rotary Table Line

Additional models of Rotary Tables are announced by Alfred A. Troyke, 4422 Appleton St., Oakley, Cincinnati, Ohio. All of the models have been redesigned and improved. Seven sizes



are now available, ranging from 9" to 25". The new tables are designed so that they may be purchased without the dividing plates, and the dividing plates may be purchased as an attachment at any time after the tables are in use in the buyer's shop.

The seven new models are illustrated and full information is given in a new 8-page bulletin which will be sent on request.

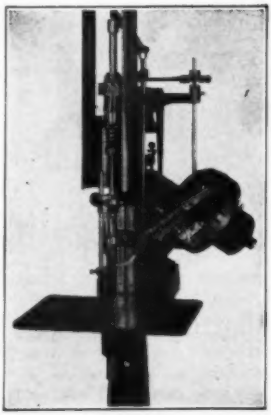
## A New Greenerd Catalog

The Greenerd Arbor Press Co., Nashua, N. H., has just issued a new 28 page catalog. This large-page booklet illustrates and fully describes the extensive Greenerd ine of hydraulic and hand operated arbor presses and is a decidedly interesting and helpful contribution to trade literature in its field.

# CUT COSTS—INCREASE PRODUCTION

with

## DETROIT POWER SCREWDRIVERS



Model B

**These MAGAZINE FEED POWER SCREWDRIVERS DRIVE SCREWS FASTER THAN EVER BEFORE.**

Machine screws, wood screws, brass screws, aluminum screws, self-tapping screws, drive screws, cap screws, special screws, washer assembled screws.

Standard heads, special heads, Phillips heads, slotless heads.

**THREE MODELS AVAILABLE**

which provides handling a wide range of screw sizes. From a No. 2-56 screw to a 5/8" cap screw.

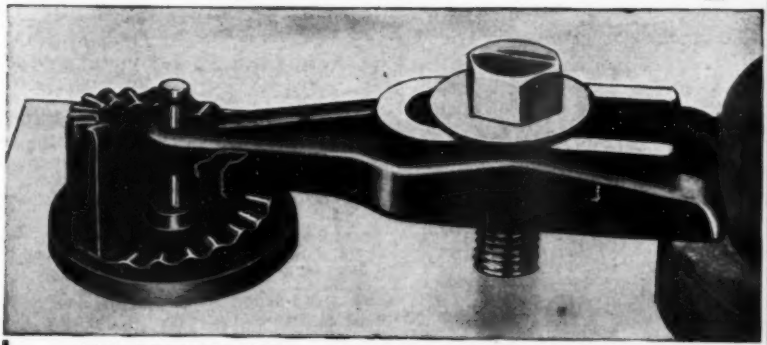
**UNIFORM TENSION—NO MARRING OF HEADS**

No stripping of threads.
DRIVING TIME: 1 to 2 seconds per screw.

**SEND SAMPLES FOR PRODUCTION ESTIMATES**

**DETROIT POWER SCREWDRIVER CO.**
**5363 ROHNS AVENUE DETROIT, MICH.**

# K-O Adjustable U-Clamps

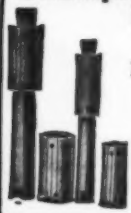


K-O Adjustable U-Clamps are made in 3 styles and six sizes. Cut shows our No. 4 for ½ or ⅝ in. bolt. Price $1.25 each.

*Send for circular showing all sizes, specifications and prices.*

**K-O PRODUCTS CO.**
**BENTON HARBOR, MICHIGAN**

**Champion Expanding Mandrels**



½" to 6½"
Efficient—
Dependable—
*Write for catalog*
THE WESTERN TOOL & MFG. CO.
Springfield • Ohio

**ARMGLO**

Manufacturers of Resistance Welders—Foot, Motor, Air and Hydraulic operated.

•

Standard and for specific applications with and without electric timing control.

•

Bench type filing and sawing machines and abrasive band finishing machines.

•

**ARMGLO COMPANY**
Milwaukee, Wisconsin

## Nedco Reciprocating Sander

The Nedco Co., 87 Rumford Ave., Waltham, Mass., presents its latest, the Nedco Model "R" Sander, a single pad reciprocating type. Powered by a light

compact motor, power is transmitted effectively through a floating mechanism to the pad. Oversized, grease-sealed ball bearings are used throughout. Built for long-life, the machine is light, weighing only 6 pounds. Compactness permits use in places where close clearances at the present time require hand sanding or rubbing. It is especially designed for sanding or rubbing filler for the machine tool builder. It has numerous other uses where hand sanding is done. The removal of paint, rust, and sanding of various undercoats is a simple matter. Material Savings over hand methods and improved results are claimed.

## Wilkie Issues Machine Tool Calendar

A new high in useful and attractive calendars has been registered by Leighton A. Wilkie, President, Continental Machines, Inc., 1300 S. Washington Ave., Minneapolis, Minn., with his 12 easy

**NO BELT SLIPS WITH VACUUM CUP C. I. PULLEYS**

2" to 72" Dia.
Pat'd U. S. Canada Great Britain
*30 Day Free Trial Offer.*
*Stock most Standard Sizes to 16" Dia.*

**Shut Off Expense Caused by Slippage You Save Money on Every Installation**

NEW LOW PRICED PRODUCTION LINE
SOME OF SIZES LISTED BELOW **Send for List—On the Shelf**

| Dia. | Face | Price | Dia. | Face | Price |
|---|---|---|---|---|---|
| 2 | "x2½" | $1.25 | 4 | "x3½" | $2.85 |
| 2½ | "x2½" | 1.45 | 4½ | "x5½" | 3.95 |
| 3 | "x3" | 2.25 | 5 | "x4½" | 4.25 |
| 3½ | "x3½" | 2.55 | 6 | "x5" | 4.75 |

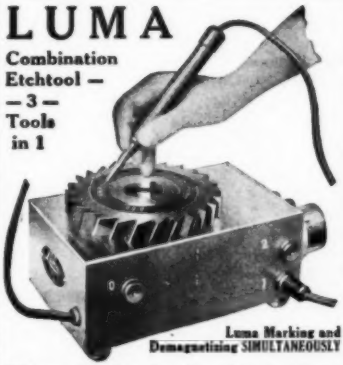
Increase *your* Production

We supply Fractional Dia. and Face Pulleys—From large casting stock.

**VACUUM CUP METAL PULLEY CO., INC.**
12536 Grand River Ave., Detroit, Mich.

# LUMA

**Combination Etchtool — —3— Tools in 1**



Luma Marking and Demagnetizing SIMULTANEOUSLY

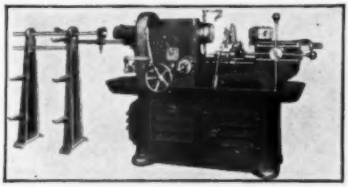
Writes on hardened steel — demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact—easy to use—dependable.

*Send for details—5-day FREE TRIAL OFFER!*

**Luma Electric Equipment Co.**
Dept. H—Main P. O. Box 132, Toledo, Ohio

# MOREY
# No. 2G TURRET LATHE

**RANGE: 90 to 1800 RPM or 180 to 3600 RPM**



Motor driven—1" wire feed—6½" turning length. Handles a wide variety of work at low cost. Designed particularly for the use of modern cutting tools.
Details and specifications in **Bulletin No. 629.**

***Send for yours today.***

**Morey Machinery Co., Inc.**
410 Broome Street, New York, N. Y.

# IT'S GOOD BUSINESS

**To Protect Those Piles of Steel Sheets Against RUST DAMAGE**

**WITH OUR SPRAY PUMP AND NON-RUST OIL**

With this convenient five gallon tank and pump and PROTEX non rust oil, one man can quickly rust-proof the edges of thousands of steel sheets. Costly rust damage is prevented at trifling expense.

This quart size pump is recommended for those plants not requiring the larger size.

# IT'S ALSO GOOD BUSINESS TO USE

☐ **SOLDER** (Melto-Matic) A superior self-cleaning and self-fluxing paste solder.

☐ **LUBRICANT** (3-B and No Sep) 3B is a standardized lubricating compound. No Sep for circulating systems.

☐ **GRINDING COMPOUND** (Aqua-Sol) A water-soluble. Gives better finish.

☐ **CUTTING AND MACHINING COMPOUND** (Zeta Sol) A water-soluble coolant lubricant.

☐ **DRAWING COMPOUND** Non-scratch. Oil or water-soluble types.

Check items in which you are interested. Attach to letterhead for samples.

**WAYNE CHEMICAL PRODUCTS CO.,** 9446 COPELAND AVE., DETROIT, MICHIGAN

## Vernon Combination
## VERTICAL MILL & JIG BORER

DIAL INDICATORS registering to .001" and Measuring Rods are available on longitudinal and cross feeds, for precision work. Large dials permit visual splitting of graduations so operator can work to fractions of one-thousandth of an inch.

**SLOW OR RAPID TRAVERSE TO QUILL**

2-speed quill arranged for either compounded slow hand feed or one-to-one rapid hand traverse.

**8 Spindle Speeds — range, 250 to 4200**

Table size, 6"x21".
Maximum distance, Table top to spindle end, 10½".
Movement of sliding head, 10½".
Vertical travel of quill, 3".
Longitudinal Table Travel 12".
Cross Table Travel, 6".
Saddle length, 11".
Full ball-bearing.
Streamlined design.
Motor ½ h.p. 60-cycle, 1750 r.p.m.
As an extra, can be equipped with new Profiling Attachment for duplicating work.
Deliveries Prompt.

*Write for Bulletin and Price.*

*The Vernon Line of*
HORIZONTAL MILLING MACHINES,
COMBINATION VERTICAL MILLING
MACHINES & JIG BORERS, & 11" SHAPERS

**MACHINERY MANUFACTURING CO.**
5915 EAST 51ST STREET, VERNON, LOS ANGELES, CALIF.


lessons in machine tool evolution and practice.

In large poster form, with many illustrations and a minimum of copy, the calendar sheets outline the basic principles of machine tools and metal working. If the fundamentals are acquired, the rest is a matter of detail. Each month, a new step is presented in a comprehensive manner, so that at the end of the 12th lesson, the reader is acquainted with all the basic metal cutting facts. The lessons, of course, should be supplemented with actual shop practice.

It is Mr. Wilkie's belief that American supremacy can be maintained only by increased production, and young men who master some branch of mechanical craftsmanship have a 20 to 1 better chance to obtain lucrative employment than the untrained who seek white collar jobs.

While the supply lasts, copies of the calendar will be sent gratis to firms that have suitable places to display the lessons.


## MAKE SPRINGS *with* Blaner Universal Hand SPRING WINDER
*in a jiffy!*

Here's a profitable tool room unit. Quickly makes hundreds of sizes of springs. Sturdy, dependable . . . a real time and money-saver.

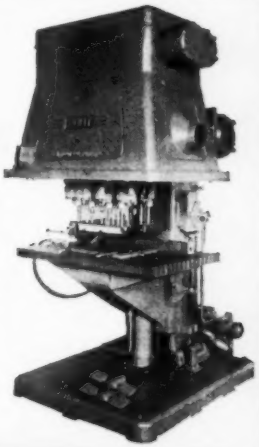
Illustrated is No. 4 Universal with adjusting shaft of 5/16" square. Takes wire up to ¼" diam.

**Patent No. 2052443**
*Write for your Circular.*

**THE JOHN BLANER CO.**
Corner Meek & Elm, Sharon, Pa.

# ROOT

## Multiple Driller No. F 400



Designed to drill a large number of regularly or irregularly spaced holes over a rectangular area 18"x36".

By the use of the Root Multiple Driller, labor costs are greatly reduced and production increased. A number of different size holes may be drilled speedily in one operation. Duplicate quantity production is obtained with worthwhile savings in assembly costs.

*We will be glad to send you all the data on this time and money saving machine.*

**B. M. ROOT CO., - - - YORK, PA.**

# TOOL ROOM BENCHES

## For all Purposes

These benches are designed for precision tool work. They are now being used in some of the largest machine shops and plants in the country. Sturdily built throughout. Many drawers for keeping gauges, calipers and small parts. Priced so reasonable you cannot afford to be without one.

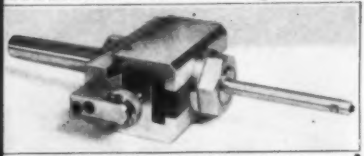
We also make benches to your specifications. We have been in business since 1885.

*Please send for catalog and prices.*

**J. H. ROSBERG MFG. CO.**

**650 N. KEDZIE AVENUE, CHICAGO, ILL.**

MODERNIZE PRESENT EQUIPMENT



Russell Boring Bar bores 9/16" to 12" dia. with boring axis parallel to shank axis. One compact tool, with micrometer adjustment.

RUSSELL BORING BAR CO.
Middletown, Ohio

BURKE

MILLING MACHINES

Make Fast Work of Small Jobs

Motor Driven

Timken roller or ball bearings to spindle

*Write today for circulars.*

Burke Machine Tool Co.
97 E. 16th St., Conneaut, Ohio

## Skilled Labor Shortage Increasing

An even more acute shortage of skilled mechanics next spring than at present was forecast by Frederick E. Searle of the Ford Motor Co., recently.

Mr. Searle who is in charge of the new Ford school in which mechanics will be trained for the Navy Department, in addition to other Ford Industrial Schools, said that much of the present shortage of skilled labor is due to restrictions on immigration, and failure of educational systems to adjust themselves to the stoppage of the influx of skilled mechanics from Europe.

While the larger industrial companies, according to Mr. Searle have established training courses for mechanics to take care of their own needs, smaller industries are badly handicapped. Cooperative training of such men by groups of little business was one solution offered by Mr. Searle.

Recently the A. S. T. E. completed a survey showing a shortage in excess of 1,250,000 men in Tool Engineer, Tool and Die making and skilled mechanic classifications. This alone is a formidable production bottleneck.

## Ampco Metal Machining

To help maintenance engineers and machine tool foremen to handle their compactly grained aluminum bronze correctly, Ampco Metal, Inc., 1745 So. 38th St., Milwaukee, Wis. have reprinted and are offering free to interested officials, copies of their Engineering data sheet. This four page bulletin is illustrated with diagrams, showing correct methods for drilling, reaming, tapping, milling, and grinding Ampco Metal.

FAMCO

ARBOR PRESSES FOOT PRESSES

Scientifically designed, accurately machined from selected materials.

40 STOCK SIZES and MODELS (bench and floor types). Immediate shipment from stock.

*Write for prices and literature*

FAMCO MACHINE COMPANY
1320 18th St., Racine, Wis.

## S. A. E. 4640 Stocked by Ryerson

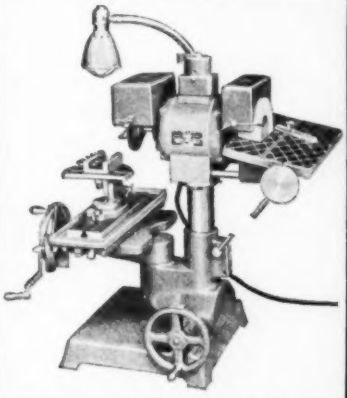
Users of S. A. E. 4640 steel will be interested to know that this gear steel is now carried in stock for immediate shipment by Joseph T. Ryerson & Son, Inc., Chicago. Stocks include hot rolled annealed rounds, in sizes from 1" to 5".

Because of its high fatigue resistance, toughness, and ability to attain a high degree of hardness with minimum of distortion in heat treatment, S. A. E. 4640 is one of the most popular gear steels of the medium carbon grades. It will develop high hardness and tensile strength with a relatively mild quench. It is emphasized that this mild quenching operation, together with the stability and balance of the alloy itself, tends to reduce distortion in the finished part. This steel is claimed to show higher impact resistance at high hardness than other .40 carbon alloy steels.

The machinability of both annealed and heat treated S. A. E. 4640 is said to be superior to other steels of this type. It can be satisfactory machine-finished at 400 Brinell. Nickel molybdenum steels of this type in the hardened condition are claimed to resist cracking under severe surface grinding better than many other alloy steels at equal hardnesses.

In addition to gear use, S. A. E. 4640 is recommended for arbors, racks, worms, boring bars, spindles, clutches, piston rods, bolts, studs, ratchets, pins, and other applications where resistance to shock and great toughness are necessary at relatively high hardnesses.

**This One Compact Machine Will Keep Your Carbide Tools In Perfect Working Condition**



**Universal Carbide Tool Grinder**

Every operation necessary for the upkeep of cemented carbide tools can be performed on this machine. Its simplified operations save 30 per cent of the time otherwise spent in sharpening tools which—in turn—returns the cost of the machine in improved output.

*Ask for Bulletin CTG40-1H.*

**K. O. Lee Company**

*Aberdeen, South Dakota, U. S. A.*

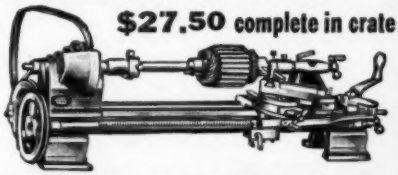
***New Model No. 40* ARMATURE LATHE**

This NEW model Armature Lathe takes all armature and starter shafts. 26' bed, 18' cutting range, 6' swing. Take-up gibs and slide-ways machined to 60°. Compound swivels 360°.

*Write today for complete specifications*

**Can be used for light metal and wood turning.**

**$27.50 complete in crate**



**ZOERMAN-CLARK MFG. CO., Inc., - Jackson, Mich.**

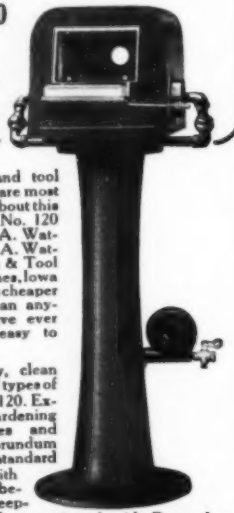
"2300° F. in 30 Minutes"

says R. A. KAPLAN, President Owatonna Tool Co., Owotonna, Minn., of the

JOHNSON FURNACE

No. 120

For Hi-Speed Steels



Machine and tool shop owners are most enthusiastic about this new Johnson No. 120 Furnace. A. A. Watkins of the A. A. Watkins Machine & Tool Co., Des Moines, Iowa wrote "It is cheaper to operate than anything we have ever used, and easy to control."

For speedy, clean heating of all types of steel use No. 120. Excellent for hardening punches, dies and tools. Carborundum hearth is standard equipment, with burner flame below hearth. Peephole in front door equipped with Pyrex glass, for watching operation without opening door.

Air and gas adjustments make temperature regulation easy. The Johnson Blower has cast iron housing, cast aluminum wheel and General Electric motor. Firebox (13½"x7¾x5") lined with 2½" insulating refractory.

**Pedestal Style, $129.50 F. O. B. Factory**

**Bench Style, $104.50 F. O. B. Factory**

CLIP AND MAIL TODAY

Please send me full free information on Jonnson No. 120 Furnace.

Name.....

Address.....

City.....State.....

JOHNSON GAS APPLIANCE CO.

Cedar Rapids IOWA

302 E. Ave. NW. Our 40th Year


## "Plastic" Planes

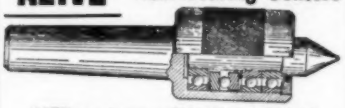
A large, new industry that may soon bring flying to the private citizen through the use of plastic "flivver" airplanes is visualized by Dr. A Allan Bates, Westinghouse manager of chemical and metaullurgical research.

Were it not for the war, these small plastic planes probably would be coming off the country's production lines by 1942 in large numbers, and at a price many people could afford, according to Dr. Bates. However, the present concentration of American aircraft manufacturers on war and defense orders may delay the large-scale production of these 'flivver" planes for private use until after the war is over.

He emphasized small planes, saying the larger ones—commercial transports and bombers—probably would continue to be made of metals for many years to come. Furthermore, the advent of the "flivver" plane may be expected to make Americans so much more airminded that they will ride more in commercial transports, thus increasing the demand for all-metal planes as well.

Some of the modern plastics are said to be, weight for weight, as strong as steel. Others insure safety of planes because they are fireproof and because they naturally absorb engine vibrations. Elimination of rivet heads on the outside surfaces of planes by the use of plastics can reduce wind resistance enough to increase the speed 15 to 25 per cent. Although plastic materials now cost more than aluminum or other metals for planes, the labor saved in the fabrication of plastic planes in large numbers may well permit a net reduction in price. And plastics are more permanent, since they do not rust or corrode when exposed to the weather.


"ALIVE" Ball Bearing Centers



"They turn with the work"

Write TODAY – and let us tell you more about them.

MODERN MACHINE CORP.

323 Berry St., Brooklyn, N. Y.

## GRIT-CUT ABRASIVE CUTTER

Designed for tool rooms. Can be utilized for light production. Two convenient sizes for mounting on bench. Legs supplied at no extra cost. An inexpensive cutter costing only

**$140.00**

Does quick and accurate cutting at minimum cost. No job too hard for Grit-Cut.

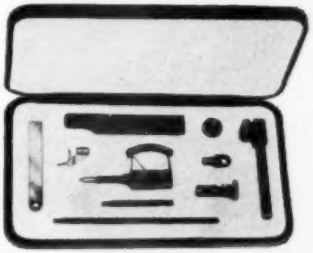
For quick repairs the cartridge type spindle can be removed and assembled spindle substituted.

The No. 6 machine capacity is 1" solid or 1¼" tubing. Size of wheel is 6". Motor is ¾ h.p. ,1725 R.P.M. Spindle speed 5000.

*Let us send you complete details.*

**WILLIAM BOUGHTER**
Whitehall Rd. near Township Line, Norristown, Pa.

## OSLUND Universal Indicator



The only indicator with 3600 reading face. Scale is easily read in any position. Accurate and quick in any set-up. Readings can be taken without mirrors when indicator is used up-side-down or facing towards back of machine. Complete indicator furnished with case as illustrated above.

*Let us send you one for examination.*

OSLUND TOOL & DIE CO.
16 Sigourney St., Hartford, Conn.

## YOU TOO CAN SPEED UP PRODUCTION

—and—

SAVE UP TO 80%
IN TIME, LABOR, ABRASIVES

THE *Easy* WAY

Machine Tool Manufacturers Say:
"The EASY Can't Be Beat for sanding filler plaster (coat)"

ELECTRIC SANDER
FOR EVERY FINISHING JOB

NEW OR MAINTENANCE WORK—sanding, rubbing or polishing . . . on flat, curved or irregular surfaces . . . wood, metal, bakelite, slate, leather, plastics, or composition materials . . . filler or sealer coats, shellac, varnish, lacquer, enamel and other finishes . . . the EASY Sander does the job much faster and produces a more uniform finish with less physical effort than is possible by hand or other methods. *Write for details today.*

**DETROIT SURFACING MACHINE COMPANY**
7432 W. DAVISON DETROIT, MICHIGAN

# WHY NOT?

$18.50 F.O.B. Arcadia, Calif.

A Venturi-Toolroom Bunsen Furnace for those 101 odd jobs. A pin or a 4 lb. die hardened in no time flat. (Natural Gas.)

**Besocke Tool & Mfg. Co.**
**Arcadia, California**



# Immediate Delivery

**Limited Quantities**

Model E reading in $\frac{1}{1000}$ & $\frac{1}{10000}$

Also Midget Indicators & Pocket Gages.

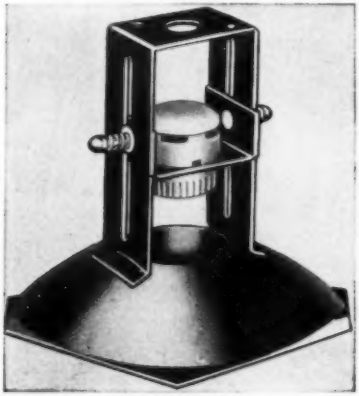
**Waltham Dial Gage Co.**
STOW, MASSACHUSETTS


## Safety Thoughts for 1941

1. I will use extra caution in selecting and using a ladder.
2. Before using a tool grinder, I will see that the tool rest is not more than ⅛" from the grinding wheel.
3. I will report to my foreman any unsafe conditions or practices.
4. I will call an electrician instead of attempting an electrical repair myself.
5. I will never operate any machinery or other equipment unless authorized to do so.
6. I will never attempt to lift beyond my own strength. If an object is too heavy to lift alone, I will get help.
7. I will report any injury to the hospital promptly.
8. I will never wear loose garments, long sleeves or necktie when working at a machine.
9. I will never use compressed air to blow dirt off my clothing or direct compressed air toward another employee.
10. I will never wear gloves while running a drill press or when near moving machinery.
11. I will never allow my tools to have mushroomed heads.
12. If any person is in danger of being hurt due to my job, I will ask him to move.
13. I will wear goggles whenever there is the slightest possibility of getting something in my eyes.
14. If I have to use a lot of force on a job, I will brace myself to prevent possibility of slipping or falling.
15. I will keep tools and other materials off the floor so there will be no stumbling hazard.
16. I will not be a chance taker as I realize it does not pay.
17. I will learn from near accidents to prevent serious ones.
18. I will use a brush for chips instead of my hand.
19. I will be careful of sharp edges on dies and panels.
20. I will help others to work safely. (National Safety Council Bulletin)

## Infra-Red Reflector

Loss of heat in infra-red baking tunnels has now been largely eliminated with a new reflector. Known as Model "QR," it is hexagonal in shape, thus making it possible to obtain an enclosed type of near infra-red tunnel. Because it is possible to "nest" hexagonal shapes closely, an almost solid reflecting surface is obtained in a multiple assembly installation.



The new reflector measures 10-¼" in diameter, and is available in single units or in multiple assemblies. A smaller size Model "QM" measures 7-⅝" in diameter, and is similar in appearance.

Address The Fostoria Pressed Steel Corp., Fostoria, Ohio, for further details.

## Yohe Storage Racks

Shoulder-high racks for material storage save a lot of heavy lifting because the men do not have to lift higher than their heads. It is possible to save several valuable inches of floor space by overlapping the new Yohe stands which require only 23" width. In this way, with four stands (six for 20 ft. lengths) 20,000 lbs., may be accommodated without going above shoulder height—and it is only necessary to purchase one size and style of rack.

Full details may be obtained from Wm. S. Yohe Supply Co., 503 Mahoning Road, Canton, O.

## Foote-Burt Absorbs Hammond

The Foote-Burt Co. of Cleveland, announces that it has purchased The Hammond Mfg. Co. The surface grinding machines and radial drilling machines will still be manufactured by Hammond and will retain the name of Hammond.

## Tumbling Barrel Time Control

Breakage of plastic parts while being tumbled to remove flash, has always been a problem.

One large manufacturer, after a very thorough investigation, discovered that there existed a critical time period as to the length of time the parts should be tumbled.

When they exceeded this "critical period," the main piece of moulding would start to check, crack and break off.

This exact time being ascertained—

"PENCILPOINT" DIAMONDS

*for Truing Grinding Wheels*

This is one of our specialties for light work. No resetting of diamond is required. $1.50 each; $1.20 each in lots of 10; any size of steel shank. Discounts in quantities.

F. F. GILMORE & CO., 122 Dartmouth St., Boston, Mass.

**Announcing the NEW**

**ELECTRO-MATIC RECTIFIER**

**Featuring the NEW Electro-Matic Time Delay Switch.**

An efficient, dependable source of direct current for operating magnetic chucks, etc.

Rectifying tubes are protected by the NEW Electro-Matic Time Delay Switch. Entirely automatic this thermionic control is energized by d. c. output and prevents throwing load on the tubes until they are properly warmed-up. Momentary voltage failure will not cause service interruptions.

Model shown is suitable for a 36" chuck. Available in capacities from 500 to 3000 watts. Used by leading industrial plants.

*Write for details and prices.*

**Produced by makers of Neu-T-Rol Magnetic Chuck Controls.**

**Electro-Matic Products Co.**

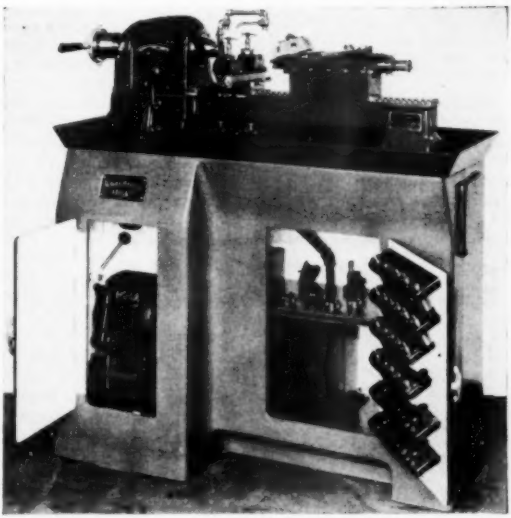
4036 N. KOLMAR AVE., CHICAGO, ILLINOIS.

the manufacturers had the R. W. Cramer Co., Inc., Centerbrook, Conn., design for them a large panel board upon which were mounted the six electrical time controlling switches capable of serving a large number of tumbling barrels.

Each of these timers was so designed as to be set when the respective barrel was put into operation and would automatically "throw off" and stop the operation before that barrel reached the "critical period."

The panel of control board was so designed as to enable the operator of any tumbling barrel to "plug in" on the "not busy" timer when he started operations. By this method, it is claimed that the engineers of the plastic manufacturers were able to eliminate approximately 70% of the breakage. In this particular operation, the tumbling action was used primarily to break off small fins and other surplus flash material from the moulded parts. The moulded parts were placed in the barrel with soap water and small wooden cubes and marbles which had a tendency to polish them as well as to remove the surplus material.

## Elgin Offers Hand Screw Machine



An improved motor driven, self-contained precision hand screw machine is announced by Elgin Tool Works, 1772 Berteau at Ravenswood Ave., Chicago, Ill.

Attractive highlights include preloaded precision ball bearings for spindle, front and rear. Drive is by V-belt and the belts can be removed and replaced without dismantling headstock, spindle or drive units. Collet capacity is 1", and swing is 9". A new design of automatic chuck closer is employed, using ball bearings instead of bronze sectors. Through the use of ball bearings, the collet closer can operate at high spindle speeds without heat and hold its lubricant.

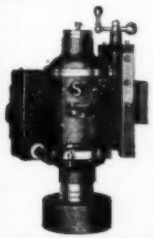
A new double tool cross slide with long base and double angle is said to prevent shifting under the heaviest work.

It is mounted on a substantial cast iron pedestal base, complete with 2-speed motor. Spindle speed range is from 230 to 3900 r.p.m. The hinged motor base locks in either up or down positions for changing belts for various speeds and is readily adjustable for belt tension.

Complete coolant pump and piping system is furnished.

Collet racks are conveniently mounted on inside of door, leaving within the base, ample room for storage of accessories.

Speed control levers are conveniently mounted on side of the headstock. The entire machine gives a pleasing impression of sturdy, cleancut, modern design.

**GRINDERS *for* PLANERS**

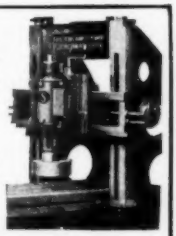
VERTICAL SPINDLE GRINDERS FOR PLANER OR BORING MILL

½ H.P. to 10 H.P. 3,600, 1,800 or 1,200 R.P.M. With Vertical or Horizontal Feed, both Feeds, or without Feed, Mounting Pad to suit.

*WRITE FOR BULLETIN 17A*

**MANUFACTURERS OF:**

Portable Electric Drills, Grinders, Blowers, Grinders, Tool Post, Snagging, Disc, Ring Wheel, etc., Buffing and Polishing Machines, ½ H.P. to 25 H.P.



**THE STANDARD ELECTRICAL TOOL CO.**

**1954 W. 8th Street, Cincinnati, Ohio**

## Segmental Tooth Saws

Notable among the records of long, continuous performance by industrial saws, are the strides being made by the new segmental tooth types of large circular saws for wood or metal cutting.

Naturally, the essential reason for the development of these inserted tooth segments, is the economy and quickness of repair in case of tooth breakage, or wear. Therefore, the most important developments are found in the saws of exceptional diameter engaged in exacting metal cutting.

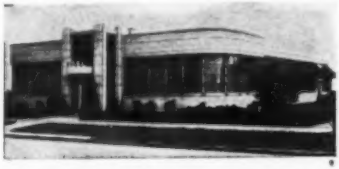
Combining this segmental feature with the speed and operating efficiency of their "curled-chip" tooth design, E. C. Atkins and Company of Indianapolis, report proof that inserted tooth cold saws are now capable of the hardest kind of service in the latest types of heavy duty circular sawing machines.

The Atkins construction provides segments of 4 teeth each riveted to the saw disc with 4 carbon rivets, and with rim alignment rivets at the joining edges of each segment. These rivets are all heat treated to same degree as section of blade in which they are located, a process which insures "even-wearing" qualities with segment joints smooth and free from high or low spots.

The teeth of all segments are of high quality high speed steel, backed with tough, heat-treated chrome-nickel steel. Because of the rigid shock-proof mounting of these segmental sections and the free cutting action of Atkins tooth design, a consistently narrower cutting width is offered, thus saving valuable material. These saws are available in diameters from 11" to 10 feet and all segments are precision-made for replacement.

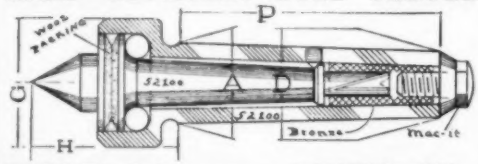
Offered as proof of practical strength and advantages of this segmental construction is the report of a tooth break occurring while cutting a number of steel bars. The operator using the saw did not tighten the vise sufficiently to hold all bars securely and one began to revolve after the cut was started. The bar twisted, breaking off 2 teeth. Close examination and tests are said

**Now In Our New Plant**
**9350 GRINNELL AVE.**



**KOEBELITE**
**DIAMOND TOOLS**
★
**Deliver a Known Quantity**
**—and Quality of Service**
★
**KOEBEL DIAMOND**
**TOOL COMPANY**
**DETROIT**

**RIGID RESILIENT BULL CENTER**




THE Aeronautical Products Inc. Co. of Detroit agrees that they have used the Rigid Live Centers exclusively for years, and have never yet known one to be overloaded, while the same work from a dead center would have melted it. Therefore they are not comparable.

**Rigid Tool Company,** 2,000 Witherell St., Detroit, Michigan

*All Morse tapers carried in stock.*

# STERLING DRILL GRINDER

CAPACITY: 2½" drills, either two or three lips

MOTOR: ½ h.p., 3450 r.p.m., 220/440 volts, 3 phase, 60 cycles, totally enclosed ball bearing motor with shaft extended both ends to carry grinding wheels. Special voltage can be furnished.

TABLE: 5"x9" with lateral and tilting adjustment for grinding any shape of bit or tool, either on face or side of wheel.

WHEELS: Two 6" diameter x 1½" face cup wheels with 4"x1" recess. One wheel with grit and grain suitable for grinding drills,—the other for carbide or high speed tools.

HEIGHT OVER ALL: 50"

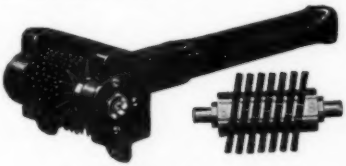
FLOOR SPACE REQUIRED: 24"x48".

WEIGHTS: Net weight of grinder comp....240 lbs. Shipping wt, crated for domestic ship't..300 lbs. Boxed for export, 12"x24"x42", 7 cu. ft..350 lbs.

**McDONOUGH MANUFACTURING COMPANY**
**EAU CLAIRE, WISCONSIN, U. S. A.**

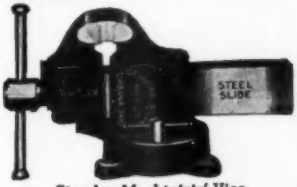
# GRINDING WHEEL DRESSERS—VISES

We manufacture the only complete line of Grinding Wheel Dressers and cutters and will gladly suggest the proper one for your wheels.



Desmond Heavy-Duty Dresser

The exclusive solid steel slide makes Simplex Vises stronger and more serviceable.




Simplex Machinists' Vise

Desmond Diamo-Carbo Dresser, best tool room dresser.

*Write for catalog H showing complete line of Desmond Dressers and Simplex Vises and name of your nearest dealer.*

**DESMOND-STEPHAN MFG. CO., URBANA, OHIO**
**Canadian Desmond-Stephan Mfg. Co., Ltd.—Hamilton, Ont.**

to have revealed that no strain had been imparted to the saw disc—that other segments were in proper shape though the particular type of accident undoubtedly would have ripped out many teeth and practically ruined other types of saws. The two segments were replaced and the saw again was in satisfactory cutting condition.

**"ALNOR" Velometer**
**An All Purpose Air Velocity Meter**
**—Instantaneous, Direct Reading.**

Measures total and static pressures as well as velocities.

*write for catalog*

**ILLINOIS Testing Laboratories, Inc.**
150 W. Hubbard, Chicago

**$25 BUYS A POSTEL DIE FILER**
*(f. o. b. Minneapolis)*

A dependable, precision tool that will soon pay for itself.

*Write for full information*

**The Postel Filing Mch. Co.**
915 Washington Ave., So. Minneapolis, Minn.

## Designing Fluorescent Lighting Systems

A new manual, "How to Design Fluorescent Lighting," is announced. Correct mountings and structural details are given in expanded form to help suggest spacings of units for maximum benefits and efficiency. The importance of room factor, including room proportions, reflection factors, and lighting equipment to be used, are fully explained.

Various levels of illumination are tabulated to simplify the selection of the proper number of lamps. Examples and design sketches, as well as a list of general lighting precautions, with remedies and suggestions, and two pages of cost analyses, also are included.

Copies of the manual may be obtained from the advertising and sales promotion department, Westinghouse Lamp Division, Bloomfield, N. J. at a cost of seven cents per copy.

## Hassall Issues Catalog No. 40

A bright and attractive new 48-page catalog No. 40 has been issued by Hassall Products, Clay and Oakland Sts., Brooklyn, N. Y.

The preface is an interesting historical review of the "Un-common Nail," from Biblical times down to the present.

The many different types of nails produced by Hassall are pictured and described. The different types of points and heads are introduced in picture and story. Also many forms of special, copper and escutcheon pins and

**Motorize Your Tools with H & Z Motor Drives**

Speed up production, increase plant efficiency and lower costs by equipping your machine tools with H & Z Motor Drives. Specially designed to meet particular needs.

H & Z engineers are prepared to survey your plant, submit recommendations and make installations without interrupting production.

***Write for particulars.***

**HERTZLER & ZOOK CO., Belleville, Pa.,** *Pioneers Since 1925*

# L-R FLEXIBLE COUPLINGS

TYPE WF

*Coupling* WITH **FLANGE DESIGN**

Designed to bolt to fly wheel, brake drum or clutch, popular with Diesel operators. Saves about ⅓ usual coupling space — just one of many L-R non-lubricated types for practically every purpose.

*Your request brings new FREE catalog.*

Lovejoy Flexible Coupling Co 5026 W. LAKE ST. CHICAGO ILLINOIS

# SHELDON ARBOR PRESSES

12 sizes ¾—to 10 tons. Bench and Floor Models, Simple or Compound Leverage. Alloy steel rack and Gear.

Milling Machine Drill Press and Shaper VISES Plain or Swivel— 5 types.

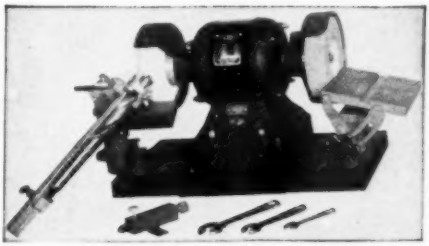
*Write for Catalog and Prices.*
*Dealers: Some Choice Territories still open*

**SHELDON MACHINE CO.**
1629 N. Kilbourn Ave., Chicago

# "ALL-IN-ONE"

GRINDS AND LAPS CARBIDE TIPPED, ALLOY AND H. S. S. TOOLS

WHEELS 6"x1½"



GRINDS TWIST DRILLS ¼" TO 1¼"

110 VOLT 60 CYCLE A.C. MOTOR 1750 R. P. M. PRE - LOADED SKF BEARINGS

**CARBIDE TOOL GRINDER**
**$89.00 COMPLETE AS SHOWN**

*SEND FOR BULLETIN*

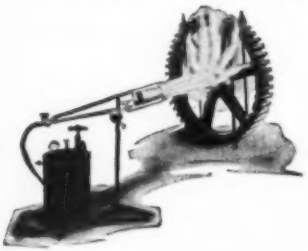
PEDESTAL MOUNTING $20.00 EXTRA. DELIVERY FROM STOCK. MACHINE IS AVAILABLE IN FIVE DIFFERENT HEAD ASSEMBLIES.

**T. C. M. MFG. CO., Harrison, N. J.**

nails. Several pages are devoted to the almost innumerable types of rivets in the Hassall line—also annular threaded screws and drive screws. The service includes many forms of special knurling and a great many different kinds of machine screws. The Company is prepared to offer many different types of secondary operations such as drilling, swaging, milling, pointing, slotting, reheading, special threading and tapping. Several pages of useful tables are included, along with considerable useful information on metals and alloys. Interesting pictures of manufacturing processes are included. Spiral bound, with an attractive cover, here is a book that will be appreciated by users of nails, screws and special screw products.

## Oil Burners for Preheating

The use of a preheating torch in connection with welding large castings of all kinds is said to benefit welders in several ways. It helps them do much better work in many instances by elim-



inating trouble that might otherwise be encountered due to expansion and contraction of the job being welded—and it will make a substantial saving of labor and gas cost on large welding jobs.

The cast iron gear illustrated came to the welding shop broken through the hub in three parts and with two spokes broken. The parts were set back in place and held together. The entire gear was then preheated with a Torit No. 8-K outfit and kept hot while being welded. Dependable jobs of this kind would be practically impossible without preheating.

The No. 8-K is one of several sizes of kerosene (oil-air) torches made by Torit. It uses kerosene or low grade distillate and it is readily portable. The torch, when operating at full capacity, gives a flame about 30" long and consumes 1½ gallons of fuel per hour. It produces an adjustable flame having a temperature of about 2,000°. Oil and air may be replenished while the torch is in operation.

Full information may be had by writing Torit Mfg. Co., 303 Walnut St., St. Paul.

## Cleveland File Catalog

A new catalog has been issued by the Cleveland File Co., Cleveland, O. It's a hand book of useful information for the man who uses or buys files. It contains full descriptions of all file types, their uses and applications.

One section is devoted to Cleveland Super Duty special purpose files. In this will be found complete details of the files made by Cleveland for such uses as iron, filing, brass and aluminum filing, lathe filing, etc.

A special feature is the illustration and description of the file marking system, originated by Cleveland several years ago. Under this system, each file is distinctly branded with its type and cut. Thus, a user can determine, at a glance, whether the file he selects is the right one for his purpose.

## Rahn-Larmon Becomes Nebel Machine

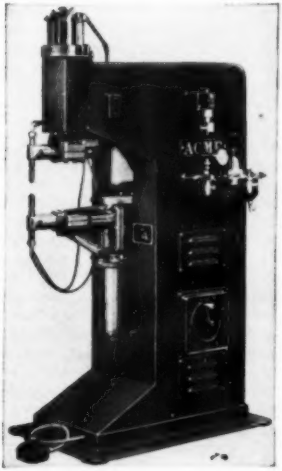
The name of the Rahn Larmon Co., Cincinnati has been changed to Nebel Machine Tool Co., and a new plant will be erected on the Parkway and Sassafras St., Cincinnati.

The Company is one of the pioneer tool industries, having been incorporated in 1899 and engaging in the manufacture of a line of lathes, 16" to 50" swing, including engine lathes, removable block gap lathes and extension bed gap lathes, geared and cone head head types.

There will be no change in the present directorate which includes F. T. Nebel, Pres.-Treas., C. K. Nebel, Vice Pres., and O. M. Dock, Treas.

## Acme Welders

A complete line of direct action air operated Press Type Spot and Projection Welders is announced by the Acme Electric Welder Co., 5621 Pacific Blvd., Huntington Park, Calif., and fully described in their new Bulletin No. 53.



The line is manufactured in transformer capacities from 30 to 150 KVA. In the smaller units, throat depths are available from 12″ to 30″, and in the larger sizes, from 12″ to 48″. Eight steps of heat regulation are standard but up to 32 steps can be supplied on special order.

All-welded fabricated steel construction is used in the bases. This provides rigidity and sturdiness, as well as streamlined appearance.

Other standard features include watercooling of secondary, column and electrodes; universal double and reversible horns; positive locking type heat regulating switch; piston packed mirror ground air cylinder cushioned on both up and down stroke, and complete air equipment including air filter.

CHICAGO

Manufactured By
CHICAGO DIE CASTING MFG. CO.
2513 W. MONROE ST., CHICAGO, ILL.

New York Office
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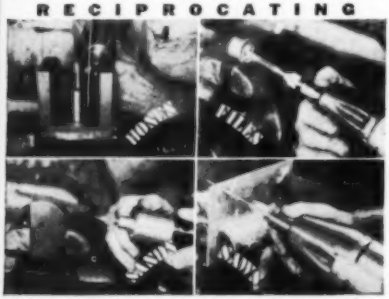
H. A. HOLDEN CO.
300 4th AVE., So. Minneapolis, Minn.

*CATALOG ON REQUEST*

## Carbide Tool Grinder Bulletin

"All-In-One grinding and lapping equipment is described in detail with photographs, specifications, and prices of various units adapted for grinding and lapping cutting tools of all types, including cemented carbide, Stellite, Rexalloy and high speed steel. Accessory equipment includes a groove grinding device for chip control, a tip cutting device for cutting special shapes and salvaging broken tips, and a drill grinding attachment which sharpens drills from ¼" to 1-¼". Write the T. C. M. Mfg. Co., 300 First St., Harrison, N. J.


RECIPROCATING




MULTI-PURPOSE is the only tool of its type with a reciprocating action and it can be used to eliminate slow, tedious and costly hand methods.

During the past two years, installations have proven their merit by increasing production in some cases as high as 6 to 1 over hand work.

The Junior Model, Series A to B

The Senior Model, Series C to F

Send for catalog that includes complete descriptions and specifications of MULTI-PURPOSE tools and accessories.

H & H RESEARCH COMPANY
12541—12th St., Detroit, Michigan


## Benjamin "Stream-Flo 60"

A fluorescent lighting unit to utilize the extra light advantages of the new 60" fluorescent lamps and embodying a new Stream-Flo development to provide for ceiling illumination, has just been announced by the Benjamin Electric Mfg. Co., DesPlaines, Ill.

This new unit, known as the "Stream-Flo 60," combines the operating and design advantages of the "Stream-Flo 48." In addition, the unit is available with a series of apertures located in the top of the reflector directly over each fluorescent lamp. These openings permit approximately 2½% of light output to pass upward to relieve contrast between lighted areas of the room and the ceiling background. By utilizing the new 100-watt, 60" fluorescent lamps, this unit extends the scope of practical fluorescent lighting applications by providing the higher levels of illumination required in many industrial locations.

In announcing the new unit, the Company asserts that it provides adequate levels of lighting for industrial locations which require higher mounting and wider spacing

SCREW MACHINE CIRCULAR TOOLS IN STOCK. *Write for Complete List.*

Banner Manufacturing Co.
1871 Clybourn Ave., Chicago, Ill.

BURR KEYSEATERS

Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

*Write for Bulletins and prices.*

JOHN T. BURR & SON
429 Kent Ave., Brooklyn, N. Y.

BAUMBACH

STANDARDIZED

Machined Steel DIE SETS Semi-Steel

Drop Forged Steel

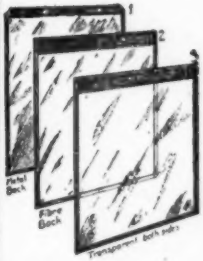
Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 195,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

*Send for our new 336 Page Catalog.*

**E. A. BAUMBACH MFG. CO.**

1810 So. Kilbourne Ave., CHICAGO, ILL.

*Protect* **Shop Orders, Drawings, Blueprints...**




*with*

**WADE Shop Envelopes**

Any size or style to order, stiff or flexible, to suit your requirements.

*Send for folder and quotation.*

**WADE INSTRUMENT CO.**

1422 E. 109th St., Cleveland, O.

*"Its the handiest tool in the shop . . .*

We can do SMALL TOOL AND DIE GRINDING CHEAPER ON THIS MACHINE than on our large automatics which not only require greater set-up time but, due to over-travel and less flexibility, longer grinding time, too."

That, in essence, is what users tell us. Machines are moderately priced, so that it pays to install them at points convenient to the men who frequently have small grinding to do.

**BUILDERS . PROVIDENCE**

IRON FOUNDRY RHODE ISLAND

*Write for Bulletin V-644*

# MOTORIZE

with MODERN Motor Drives

## ATTENTION

### Plant Managers and Superintendents

Uncle Sam's defense program has made most of us realize the need for increased production in the machine shop. The basic and best way to stop loss of time, power and production in the average machine shop is to **eliminate the line shaft.** This can be done quickly and cheaply at great savings in time and money with Individual Modern Motor Drives for all types of machinery.

Individual Modern Motor Drives effect a substantial saving in the cost of machine operation and at the same time make it possible for you to get practically the same production out of your old machines as you would get with new machinery.

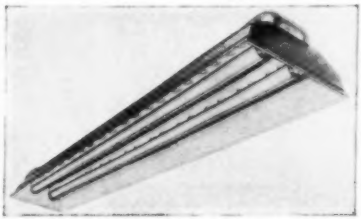
Modern Drives create a flexible condition in the machine shop so that when the type of work changes the machinery can be rearranged quickly and at the least expense.

Get in step with faster, better and cheaper production in your plant.

Address your inquiries regarding Individual Modern Motor Drives to

**Quality Hardware & Machine Corp.**
**5831 Ravenswood Ave., Chicago, Ill.**


than has heretofore been considered practical for fluorescent units. It pro-



vides twice as much light as the "Stream Flo 48," thus approaching the goal of 50 foot candles of general fluorescent lighting from installations with 10 x 10 foot spacing.

### Empire Manufactures Luers Tools

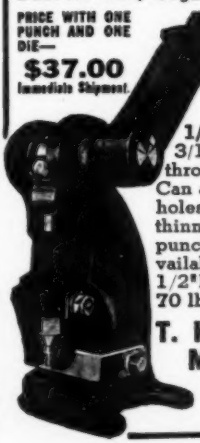
The Empire Tool Co., 8790 Grinnell Ave., Detroit, Mich. announces that it is now manufacturing the well known Luers Cutting-off blades and holders, under license issued by John Milton Luers Patents, Inc.


**T. H. L. FRONT LEVER**

## BENCH PUNCH

Built for hard, tough work — die cannot lose alignment with punch — all parts interchangeable.

**PRICE WITH ONE PUNCH AND ONE DIE—**
**$37.00**
**Immediate Shipment**



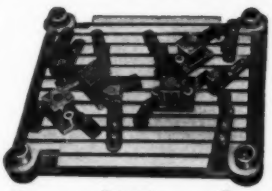
Capacity — 1/2" holes through 3/16" steel; 13/32" through 1/4" steel. Can also be made for holes up to 7/8" in thinner metal. Stock punches and dies available from 1/16 to 1/2" by 64ths. Weight, 70 lbs.

**T. H. Lewthwaite Machine Co.**
*(Est. 1890)*
**311 E. 47th St., NEW YORK**

# UNIVERSAL PERFORATING

## 100% ADJUSTABLE DIE ASSEMBLIES

**CAN BE CHANGED AT WILL—WITHOUT ADDITIONAL DIE EXPENSE**



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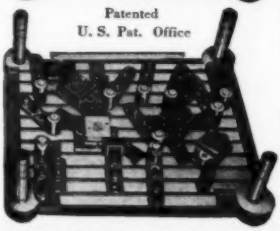
U. S. Pat. Office



WHISTLER Universal Perforating Dies provide an efficient, economical method for quickly setting up dies for any and every type of perforating or notching of flat sheets up to and including ⅛" thickness. Ideal for limited production work.

**FREE** Handy catalog, illustrating and explaining Whistler Universal Perforating Dies and other Whistler dies, tools and special machinery, yours on request.

**S. B. WHISTLER & SONS, INC.**
744 MILITARY ROAD BUFFALO, NEW YORK

**WHISTLER** UNIVERSAL PERFORATING **DIES**



# CAD Standardized set-up appliances

**WHY FORCE YOUR MEN TO WASTE TIME on machine-tool set-ups when CAD Standardized Appliances will convert this non-productive time into productive labor? WHY RUIN MACHINE TABLE-SLOTS with ordinary bolts when CAD Bolts are designed to fit T-slots? Ask for CAD Folder A-57.**

CARRIED IN STOCK: *Detroit*, Chas. A. Strelinger Co.; *Cleveland*, Cleveland Tool & Sup. Co.; *Chicago*, H. Channon Co.; *Indianapolis*, Vonnegut Hdwe. Co.; *Buffalo*, Beals, McCarthy & Rodgers; *St. Louis*, Colcord-Wright Mchy. & Sup. Co.; *New York*, Franklin Hdwe. Co.; *Newark*, Squier, Schilling & Skiff; *Cincinnati*, E. A. Kinsey Co.; *Los Angeles*, Almquist Bros. & Viets; *San Francisco*, C. W. Marwedel Co.

**STANDARD SHOP EQUIPMENT CO.**
*Set-up appliances for machine tools.*
8183 Tinicum Ave., Philadelphia, Pa.

*Bridgeport* Hunter & Havens' C
*Chicago*, Samuel Harris C
*New York*, Neal & Brinker C

# Perfection

IN

# Measurement!

The Application of

**CHROME PLATE**

to gage blocks is the

**ONLY MAJOR**

improvement in the most perfect tool used by industry.

For ECONOMY and ACCURACY Dearborn Gage Co. Chrome Plated Gage Blocks have no equal.

**DEARBORN GAGE COMPANY**

*"Originators of Chromium Plated Gage Blocks"*

22035 Beech Street

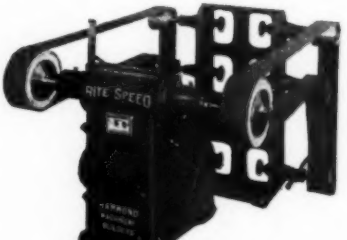
DEARBORN - MICHIGAN


They are now in position to furnish many holders for every kind of hand and automatic screw machine. The blades, of patented design, are claimed to reduce friction to a minimum, by providing both side and back clearance as well as producing a curved chip that frees itself from the side walls of the cut, eliminating frictional heat and lengthening the time of useful blade life before resharpening.

It is emphasized that the blades require sharpening on the front face only, saving sharpening time, removing and inserting time, and the time required to realign blade in proper relationship to the work and other tools. The combined blade and holder is said to have the rigidity of a solid, forged tool. Descriptive literature will be mailed upon request.

## Hammond Abrasive Belt Polisher

Hammond has just brought out an Abrasive Belt Sand to be used in conjunction with polishing and buffing lathes.



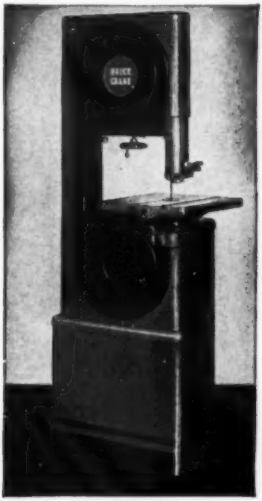

It is shown in connection with a Model 7-CH Rite-Speed Lathe, employing 5" belts but wider or narrower belts can be furnished to suit the application. Proper tension of the belts is maintained by an adjustable tightener pulley and the belts can be removed and replaced quickly.

For particulars, write the Hammond Machinery Builders, 1614 Douglas Ave., Kalamazoo, Mich.

## No. 2300 Hi-Speed 14" Band Saw

The Boice-Crane Co., 1734 Norwood Avenue, Toledo, Ohio, offer a new Band Saw.

Let's condense the manufacturers' specifications: — Wheels, 14" diameter. Maximum depth of cut, 8-5/8". Depth of throat, 13½", which will permit cuts to the center of 27" diameter work. Tilting work table, 15" x 15½". Height, 67". Weight, 322 pounds.



Single speed 1200 r.p.m., models with direct connected motors in both bench and floor types are being made. Also, V-belt drive bench models. A fourth model, made specially for the metal working trade and other industrial materials fabricators comes equipped with selective speed gear box drive providing 8 speeds:—1120, 890, 660, 450, 70, 50, 35, and 25 r.p.m. for cutting wood, fiber, metal, plastics, resins, colluloid, cloth, paper, meat and bone, and many others.

A recently published 8-page bulletin gives complete details.


AUTOMATICALLY
Sharpens Metal Saws in Gangs

WARDWELL No. 57T
Automatic Circular Saw Grinder

Designed for sharpening form Milling Cutters, Slitting and Slotting Saws from 2" to 8" dia.— in gangs up to 3¾" thick,— with tooth spacing up to 1¼" from point to point.

Automatically indexes saws one row of teeth at a time. Grinding wheel is shaped to suit the gullet of the tooth. Sharpens a gang of saws within a variation of plus or minus .001 of exact dia. of entire lot. A group of 250 saws .015 in thickness can be sharpened at one time.

GRINDS WET OR DRY

*Let us send you all the details.*

THE WARDWELL MFG. CO.
3165 Fulton Rd. - Cleveland, Ohio

*Yes Sir!* **NO DIES!**

"Micro" Die Substitute Machines save die costs and time on small lots. One machine is

**"Micro" Bench Brake**

Creates non-stock sized angles, channels, Vees, etc. Folding width 6". Accurate to .001". *Write for prices and circular* "Metal Duplicating without Dies."

**O'NEIL-IRWIN MFG. CO.**
314 - 8th Ave. So. Minneapolis, Minn.

**Jackson Milling and Boring Machine**

Specially designed for High Speed Precision and Production Milling and Boring. Unexcelled for pockets, slots, angles, and compound angles up to 90°. 4" vertical spindle motion. Rigidly constructed. Working surface 8"x24".

*Write today for full details*

**Jackson Machine & Tool Co.**
Jackson, Mich.

## Electro-Matic Rectifiers

A new line of full wave rectifiers, supplying direct current particularly for magnetic chucks is announced by Electro-Matic Products Co., 4036 North Kolmar Ave., Chicago, makers of Neu-T-Rol controls.

Sizes range from 500 to 3000 watts capacity, for voltages required.

An outstanding feature is the new Electro-Matic time delay switch.

Entirely automatic, this novel feature uses a thermionic tube, energizing the control direct from the rectifying tubes. It prevents throwing the load on the tubes until they are properly warmed-up. Momentary voltage failure will not cause any service interruption.

The model illustrated is suitable for

**Save Time and Labor on Repeat Operations**
*by using* **Colwell Tool Post Turrets**

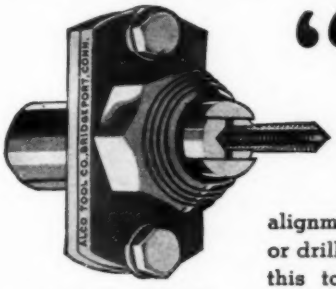
Available for 9" to 20" lathes. "Midget" sizes for smaller lathes. Also furnished for turret lathes. Provides four positions. In operation it is fast, simple, accurate and dependable.

*Write TODAY for bulletin and prices.*

**S. G. COLWELL, 25 Congress Ave., Providence, R. I.**

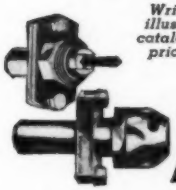
# A NAME TO REMEMBER

# "ALCO"




For only Alco Tap and Drill Holders offer the automatic screw machine operator a chuck with floating alignment and adjustability for any size tap or drill within its capacity. And remember this too — *Alco Tools require no bushings!*

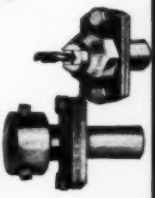
*Write for illustrated catalog and price list.*



**THE ALCO TOOL CO.**

835 Housatonic Ave., Bridgeport Conn., U. S. A.

ALCO EFFICIENT TOOLS

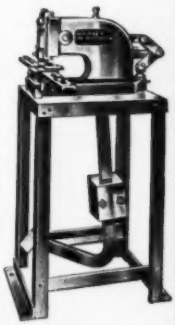


**BENDING BRAKES** **WHITNEY-JENSEN** **METAL TOOLS**

**Combination Bending Brake**

Combination Roller Bearing type. For all kinds of straight bending and quickly converted to box and pan work. Roller bearings make work 40% faster, 20% easier. Made in a wide range of sizes and capacities. With Hardened Jaws for fabrication of stainless steel.

**NOS. 28 & 29 FOOT PRESSES**

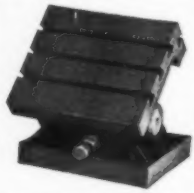


Capacity 2" hole in 16 gauge iron — stroke of ram ⅞" — adjustment ¾". Depth of throat No. 28—7", No. 29-10".

***Write for new Catalog No. 14***

WHITNEY METAL TOOL COMPANY

115 FORBES ST., ROCKFORD, ILLINOIS



**McMAHON**
**Adjustable Angle Plate**
For grinding any angle accurately.
*Two sizes*
Model "A" with T slots 3½x3½ ..... $12.
Model "B" with tap hole 6x7½ ..... $30.
*Desirable territory open for dealers*
FRANK McMAHON CO., 142 JUNE ST., DAYTON, O.

**PANTO**
**COMBINED ENGRAVER and ELECTRIC ETCHER**

Compact pantographic bench-type machine, with interchangeable heads, for wide range of small work. Illustration shows engraving head attached.

**CUTTER GRINDER**
Accurate inexpensive unit for sharpening single-lip engraving and routing cutters.

**MASTER COPY TYPE**
Plastic-molded for 3-dimensional, and brass for 2-dimensional and 3-dimensional engraving and die-cutting machines.

**CUTTERS AND ENDLESS BELTS FOR ALL TYPES OF ENGRAVING MACHINES**

• *Write for Literature*

H. P. PREIS ENGRAVING MACHINE CO.
157A SUMMIT ST., NEWARK, NEW JERSEY

use with a 36" magnetic chuck, and requires no attention on the part of the operator beyond throwing the a.c. supply switch.

A present machine shop trend is toward the individual motorizing of tools. Neu-T-Rol magnetic chuck controls are now built-in. This new rectifier suggests building such d.c. current supply units into grinders as a means of simplifying wiring, etc.

## Grit-Cut Abrasive Grinder

A new "Grit-Cut" Abrasive Cutter has been developed by Wm Boughter, Whitehall Rd., near Township Line, Morristown, Pa.

Intended for tool room use it can also be utilized for light production.

It is made in two convenient sizes, No. 6 and No. 10. Either size is suitable for mounting on a bench, requiring little space.

Where a machine is required for light production work, legs can be supplied at extra cost, making the machine portable and suitable for moving to the work, plugging into an ordinary light socket.

For quick repairs it is equipped with a cartridge type spindle which can be removed and substituted with another spindle assembled ready for use. The old spindle can then be returned to the factory for repairs and again used as a spare.

No. 6 machine capacity—Solid 1", tubing 1½".

Approximate weight crated is 250 lbs.

Size of wheel. 6". Spindle speed is 5000 r.p.m.

Motor supplied—¾ h.p. 1725 r.p.m.

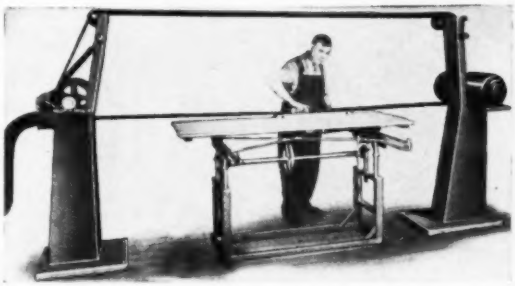
**GOOD NEWS!**
**for DIE MAKERS**
**Transfer Points Eliminate Guesswork in Die Making**

There's no chance for error when you use transfer screws as markers in setting dies. Points are of uniform height above hex base. Six accurately made and hardened screws nest in a special holder with hex wrench tip. Made in ¼" to 1" diameters.

3/16" ..... $1.50 per set
1/4" ..... 1.20 " "
5/16" ..... $1.25 per set
3/8" ..... 1.35 " "
7/16" ..... $1.40 per set
1/2" ..... 1.50 " "

**HEIMANN MFG. CO., URBANA, OHIO**

## Jefferson Endless Belt Sander



A new, endless-belt sander for metal or wood - working is announced by Jefferson Machine Tool Co., 700 W. Fourth St., Cincinnati, O.

Eliminating costly hand sanding, it permits economical and speedy finishing of large flat surfaces, as well as concave, convex or irregular work.

The substantial table travels on ball bearing rollers and is easily moved to carry the work back and forth while the operator applies pressure to the flexible belt with block or pad.

Belt travels at a comfortable level for the operator. There is no cross rail, between standards to obstruct vision.

Standards are of sturdy welded steel construction, self-supporting and may be placed any required distance apart.

Main sand belt pulleys are 12" diameter by 8" face" accommodating belts up to 8" width. Heavy dust proof ball bearings are used, equipped with Alemite lubricators. Drive is direct from a 2 h.p. motor. For metal finishing, the belt travels at approximatey 1800 s/f/m. For wood-working, 5000 s/f/m.

**TITE-GRIP** for small V-belts **& ROLA-FLEX** for Leather or Fabric Rubber Belts

**2 NEW PRODUCTS.** Both with tools found in every machine shop.

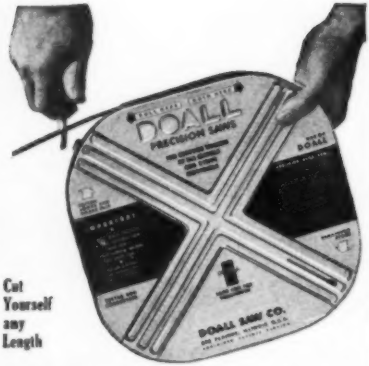
**TITE-GRIP** grips the broad side of the belt which makes a connector four times stronger than the wire hook connectors ordinarily used. Designed to give satisfactory service on leather or fabric rubber V-belting now being manufactured in rolls. 8 sizes to fit V-belts ⅜" "O" size to 2" "F," size.

**ROLA-FLEX** lacings have self lubricating links or roller links and are finished with silver-like rust-resisting Cadmium plate.

**WRITE for Bulletin No. 41C**

*(If interested in GRIP-FLEX, a connector for cord and rope V-belts write also for Bulletin No. 40B.)*

**SHIPPERT MANUFACTURING CO., 414 C. South Galena Ave., Dixon, Illinois**



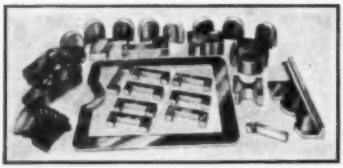

Cut Yourself any Length

# DoALL BAND SAWS

**Now in Special Metal Boxes**

Just what band saw users have been asking for — a modern, compact, convenient way to stock saws. Safe to handle, easy to get at. Window shows how much saw remains in box. DoAll Saws last twice as long because of their high tensile strength. Originally developed for the DoAll Contour Machine, but most of the widths are also adaptable to metal cutting band saws.

**FOR REALLY TOUGH JOBS:**



A group of special parts made at Ingersoll Milling Machine Co., Rockford, Ill. Tool steel was cut at the rate of 1½ square in. Cast iron 3½ square in. per minute. This is typical of the kind of work DoAll Saws do faster and better on all metals including cold rolled nickel, ductile aluminum alloy, laminated low carbon steel sheets, neoprene, etc.

**FREE TEST**

Send your difficult metal cutting job to our Testing Laboratory for experiment.

*Send for booklet ACTUAL PERFORMANCE RECORDS OF DOALL SAWS*

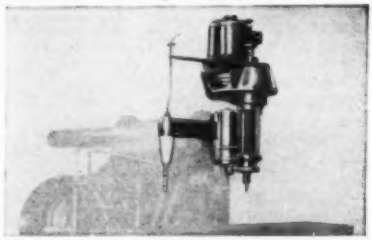
DO SAWS ALL

**THE DoALL COMPANY, Inc.**

1206 Thacker St., Des Plaines, Ill.

## Hydraulic Duplicating Attachment

The Duplicating Attachment Co., Clairpointe Ave., Detroit, Mich., offers a No. 3C high-speed head with a hydraulic duplicating attachment. This equipment is designed to handle the average range of work in small, as well as large, die shops and engraving shops engaged in making plastic, rubber, Bakelite, and drop-forging dies.



The plastic or wooden model is placed below the tracer, and the die is placed below the cutter. By feeding the table of the milling machine back and forth, the tracer automatically controls the vertical travel of the cutter, which produces an exact duplicate of the model. A pressure of less than 1 pound is exerted on the tracer, while the cutter is subjected to a pressure of about 500 pounds.

There is a distance of 17 ¾" between cutter and tracer, and vertical travel of the spindle is 4". The spindle will take a No. 9 B&S taper-shank holder for end-mills of the draw-bar type. The spindle is driven by a ½ h.p., 1125-r.p.m. motor, and there are four speeds ranging from 225 to 3400 r.p.m.

**ARMSTRONG-BRAY & CO.**
***"The Belt Lacing People"***
**315 N. Loomis St., Chgo. U. S. A.**

WIREGRIP Belt Hooks —6 sizes of tough hooks conveniently carded. No waste. Makes smooth humpless flexible joint on all flat belts.

STEELGRIP Lacing — 8 sizes, applied with a hammer. For all flat belts on tough drives. Prevents end fraying.

Here at one source are all belt lacing needs, dependable satisfactory products of guaranteed material and workmanship. *Write for Catalog.*

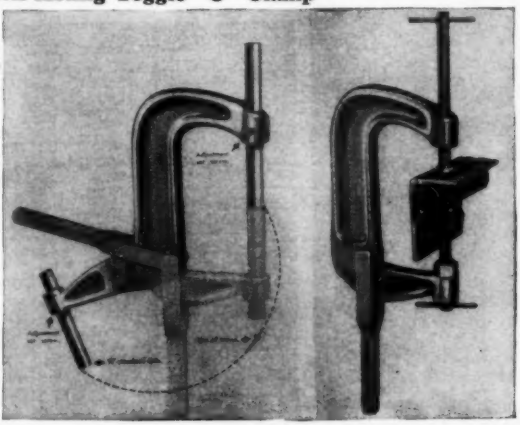
**EVANS *High Speed Steel* REAMERS**

*LOOK AT THESE FEATURES*

- No honing.
- Will not chatter.
- Chrome-like finish.
- Perfect alignment.
- Full bearing surface.
- Left and right spirals.
- 50 to 80 thousandths expansion.
- Cannot fall in slots or oil grooves.
- Extension pilots for line-up work.

WILL SHIP ON 30 DAY'S TRIAL | **EVANS FLEXIBLE REAMER CO.** Ravenswood & Wilson Ave., Chicago, Ill. | WRITE FOR CIRCULAR

## Quick Acting Toggle "C" Clamp



A new, portable clamp which the manufacturer believes combines the advantages of the old "C" clamp with swift toggle action, and is so designed that it will hold together many types of work not formerly possible, is now being produced by Detroit Stamping Co., 347 Midland Ave., Detroit, Mich. The new clamp has two holding rods instead of one; and when released by toggle action, the entire lower half swings clear of the work.

The operator is thus enabled to get around obstructions in fixtures, and to take in and clamp firmly such pieces as angle iron or T-shaped iron.

The two-rod adjustment permits holding the work at exactly the right spot; and after once set, need not be varied.

Two models are available. One has two threaded rods which permit quick, easy adjustment. The other has two smooth rods which are set-screw adjusted, and is especially suited to arc welding work; having no threads to burn or damage.

Clamp itself is fabricated of malleable iron, the rods of steel and the toggle handles of case-hardened steel.

The manufacturer claims that it is impossible to permanently damage or distort the toggle-action "C" clamps up to a pressure of 1000 pounds.

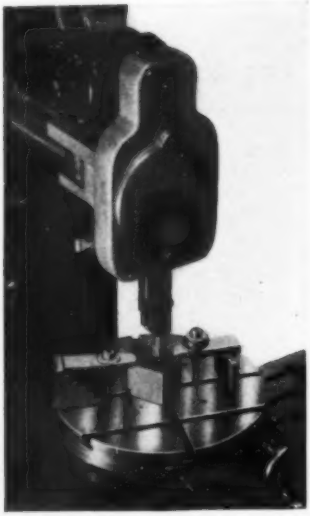
## Reeves Speed Control Bulletin

While new machine tools are so hard to obtain, machine tool users are more interested than ever before in every possible means of increasing production on existing equipment.

Variable speed control is one important way in which this can be accomplished, and in order to bring this to the attention of machine tool users, Reeves Pulley Co., Columbus, Ind., have brought out a booklet:—"Speed Control for Machine Tools," form number G-410.

The uses and advantages of speed control for machine tools are explained.

**HIGH SPEED**
**UNIVERSAL**
**SLOTTING HEAD**



Adapted to all types of milling machines by using different mountings to suit the individual application. Send us the make of milling machine and we will supply the correct adapter to fit at no extra cost. Constructed for precision work. Preloaded Timken Bearings throughout. 4-speed changes from 50 to 250 strokes p.m. or 100 to 580 strokes p.m. Ram stroke adjustable from 0 to 4½.

The Universal Slot-Master has an almost unlimited versatility. Every tool, die and manufacturing plant has numerous applications for this head.

Sold direct from factory to you.

*We will be glad to furnish any additional information you may desire.*

**Experimental Tool & Die Co.**
Dept. "B" Special Machinery Division.
**12605 Greiner Ave., Detroit, Mich.**

## Gas-Fired Unit Heaters

A new line of gas-fired unit heaters, for use in offices, factories, storerooms and similar places, is announced by the Reznor Mfg. Co., 141 James St., Mercer, Pa. The new heaters need no water

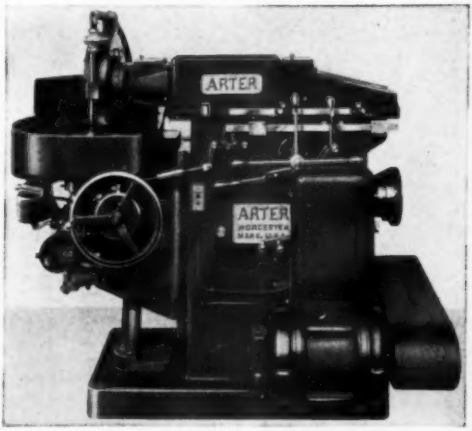
or steam for operation and are constructed to throw heat evenly over large areas. Three types, each of which is available in five sizes to provide from 55,000 to 200,000 b.t.u. are included in the line.

The fan type heater is equipped with a four-blade, electrically-driven propeller fan. This fan situated behind the heater cabinet drives cool air of the room over the streamlined heat exchanger and thence into the room, the air being heated in the process. Because of its streamlined design, the heat exchanger is said to reduce air noise to a minimum and to provide excellent heat transfer. Products of combustion are carried from the combustion chamber into the flue chamber and then to the chimney or flue and never come in contact with the air being heated.

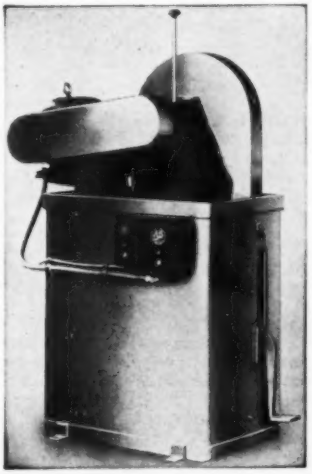
## Arter Rotary Surface Grinders

A new six page bulletin presents the Model "A" Rotary Surface Grinders, made by Arter Grinding Machine Co., Worcester, Mass.

Model A-1 machines are intended for tool room and light production work. The Model A-3 machines are of heavier proportions, for close limit work on volume production.




Typical jobs handled include bevels, single or double on discs or knives, and reliefs or concave grinds on saws and gear shaper cutters are made by tilting the work table. Chasers, reamer blades and cutter blades ground in multiple are some of the common tool room jobs. Vertical capacity of the machine permits grinding of long cylinders or work elevated by fixtures. Diameters are accurately ground, using the side of wheel and a special micrometer stop screw. Some of these jobs are illustrated, including the grinding of spacers used in super-precision, preloaded ball bearing spindles with especially close tolerances.

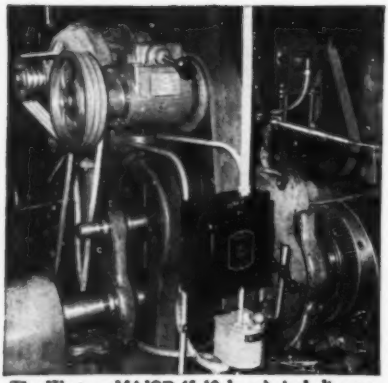
**CATSKILL**
**Model W-Abrasive Wheel**
**CUT-OFF MACHINE**

A modern Cut-Off Machine designed to save time and lost motion.

Abrasive wheel and motor balanced on heavy cast iron I spindle frame eliminates counter weights or balances. Spindle and trunnion have alemite lubricated ball bearings. Two-way stop regulates depth of cut. Welded steel base and coolant tank. Coolant pump is piped and wired separate from main drive. Cuts stock up to 3". 3 phase 5 H. P. motor. Swivel vise allows cuts from right to 45° angles.

*Let us send you our newest folder. Details —specifications and prices are given.*

**CATSKILL METAL WORKS**
**CATSKILL NEW YORK**



The Western MAJOR (5-10 h. p.), including an auxiliary drive for coolant pump on a Gisholt turret lathe — 4 speed changes, forward and reverse; bracket included—**$145.00.**

**WESTERN TRANSMISSIONS**

**FOR 1 to 10 H. P. MOTORS**

The Western MAJOR for 5-10 h. p. motors—the MASTER for 1-5 h. p. motors, provide a complete line of transmissions for lathes, milling machines, shapers, turrets, automatics, radials, and other machine tools where motor-driven, self-contained, selective speed transmission units are desired. The Western MASTER (1-5 h. p.) 4 speed changes, forward and reverse, bracket included—**$95.00.**

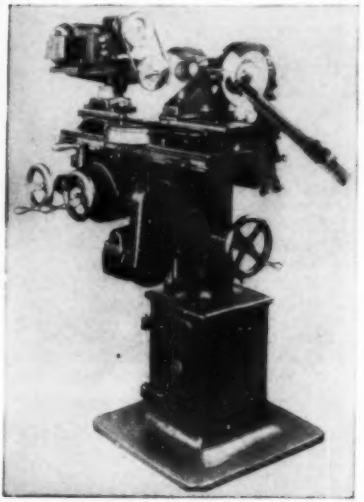
**Western Manufacturing Co.**

**3404 Scotten Ave., Detroit, Michigan**

The Western MAJOR (5-10 h. p.) on a Cleveland automatic—4 speed changes, forward and reverse, bracket included—**$145.00.**

## Sterling Tool and Cutter Grinder

The new Sterling universal Tool and Cutter Grinder is completely equipped to perform a wide range of grinding operations, such as cylindrical, surface,



internal, angular and face work. To obtain maximum manufacturing efficiency, only one size is produced having 10" swing, 18" between centers, 20" longitudinal table travel, 6" cross feed and 8" vertical movement.

The standard machine is equipped with hand table feeds and totally enclosed ball bearing motors with "V" belt drives on wheel head and headstock. 220/440 volt, 3 phase, 60 cycle motors are standard, but special voltages can be supplied. A large assortment of attachments and tools is supplied. Motor drive on table and drill grinding attachment are optional at extra cost.

It is manufactured by McDonough Mfg. Co., Eau Claire, Wis.

# *Here's Where To Buy What You Need*

This is the most complete Directory of Machine Tools, Materials and Supplies ever published in The Machine Tool Blue Book. Keep it handy for reference in selecting your 1941 equipment and determining sources of supply.

**ABRASIVE CLOTH AND PAPER**
Carborundum Co., Niagara Falls, N. Y.
**Abrasive Prod., Inc., South Braintree, Mass.**

**BALING PRESSES**
**Galland-Henning Mfg. Co., Milwaukee, Wis.**

**BAND SAW BLADES**
**Do-All Co., Des Plaines, Ill.**
**Wells Sales Corp., New York, N. Y.**
**Wells Mfg. Co., Three Rivers, Mich.**

**ACOUSTIC BOOTHS**
**Burgess Battery Co., 500 W. Huron St., Chicago**

**ADAPTERS, adjustable**
**J. C. Glenzer Co., Detroit, Mich.**

**AIR LINE PARTS**
**Air-Way Pump and Equipment Co., 569 W. Van Buren St., Chicago**
**M-B Products, Detroit, Mich.**
**Norgren Co., Denver, Colo.**

**ALLOYS, hard facing**
Haynes-Stellite Co, Kokomo, Ind.
**Wall-Colmonoy Corp., Detroit, Mich.**

**ANGLE PLATES**
**J. C. Busch Co., Milwaukee, Wis.**
Challenge Machinery Co., Grand Haven, Mich.
**Frank McMahon Co., Dayton, Ohio**
**Milliken Machine Co., West Newton, Mass.**
**Oliver Motorcraft Co., 2532 S. Wabash, Chicago**

**ARBORS & MANDRELS**
**Brown & Sharpe Mfg. Co., Providence, R. I.**
**Jacobs Mfg. Co., Hartford, Conn.**
National Twist Drill Co., Detroit, Mich.
**Pratt & Whitney, Hartford, Conn.**

**ASSEMBLY PINS**
Driv-Lok Co., Bridgeport, Conn.

**BALANCING EQUIPMENT**
**Anderson Bros. Mfg. Co., Rockford, Ill.**
Gisholt Machine Co., Madison, Wis.
Norton Co., Worcester, Mass.
**Sundstrand Machine Tool Co., Rockford, Ill.**

**BAND SAW GUIDES**
**Black Diamond Saw Machine Co., Natick, Mass.**
**Paddock Tool Co., Kansas City, Mo.**

**BAND SAW MACHINES**
**Boice-Crane Co., Toledo, Ohio**
**Continental Machines, Inc., Minneapolis, Minn.**
**Delta Mfg. Co., Milwaukee, Wis.**
**Duro Metal Prod. Co., 2649 N. Kildare, Chicago**
Grob Brothers, Grafton, Wis.
**Kalamazoo T. & S. Co., Kalamazo, Mich.**
**Racine Tool & Mch. Co., Racine, Wis.**
Red Star Products Co., Cleveland, Ohio
**Simonds Saw & Steel Co., Fitchburg, Mass.**
**Tannewitz Works, Grand Rapids, Mich.**
**Walker-Turner Co., Plainfield, N. J.**

**BAR CUTTERS**
**Buffalo Forge Co., Buffalo, N. Y.**

**BARREL STANDS**
Pollard Bros Mfg. Co., 5505 N. W. Hwy., Chicago

**BARS, boring**
**Armstrong Bros. Mfg. Co., Chicago**
**Bridgeport Machines, Inc., Bridgeport, Conn.**
Davis Boring Tool Div., St. Louis, Mo.
**Russell Boring Bar Co., Middletown, Ohio**
**Scully-Jones & Co., 1905 S. Rockwell, Chicago**

**BEARINGS, Ball**
Abbott Ball Co., Hartford, Conn.
**Ahlberg Bearing Co., 3025 W. 47th St., Chicago**
Bantam Ball Bearing Co., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Div., Bristol, Conn.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Strom Steel Ball Co., 1842 S. 54th St., Cicero, Ill.
Torrington Co., Torrington, Conn.

**BEARINGS, miniature**
**Landis & Gyr, Inc., New York, N. Y.**

**BEARINGS, oilless**
**Rhoades Metaline Co., R. W., Long Island C., N.Y.**

**BEARINGS, roller**
**Ahlberg Bearing Co., 3025 W. 47th St., Chicago**
Ball & Roller Bearing Co., Danbury, Conn.
Shafer Bearings Corp., 35 E. Wacker Drive, Chgo.
Timken Roller Bearing Co., Canton, Ohio

**BEARINGS, thrust**
**Auburn Ball Bearing Co., Rochester, N. Y.**
Bantam Bearings Corp., South Bend, Ind.
Marlin-Rockwell Corp., Jamestown, N. Y.
Timken Roller Bearing Co., Canton, Ohio

**BELT FASTENERS**
**Armstrong-Bray & Co., 315 N. Loomis, Chicago**

**BELT LACING**
**Armstrong-Bray & Co., 315 N. Loomis, Chicago**
Clipper Belt Lacer Co., Grand Rapids, Mich.

**BELT LACERS, V belt**
**Shippert Mfg. Co., Dixon, Ill.**

**BELT SANDERS**
**Armelo Company, Milwaukee, Wis.**
**Boice-Crane Co., Toledo, Ohio**
**Jefferson Machine Tool Co., Cincinnati, Ohio**
Porter-Cable Machine Co., Syracuse, N. Y.
**Production Machine Co., Greenfield, Mass.**
**Walls Sales Corp, New York, N. Y.**

**BELTS, sanding**
**Abrasive Products, Inc., South Braintree, Mass.**
**Walls Sales Corp., New York, N. Y.**

**BELTING**
Chicago Belting Co., Chicago
Graton & Knight, Worcester, Mass.
Rhoades & Sons, J. E., Philadelphia, Pa.

**BENCH PLATES**
**Challenge Machinery Co., Grand Haven, Mich.**

**BENCHES, factory**
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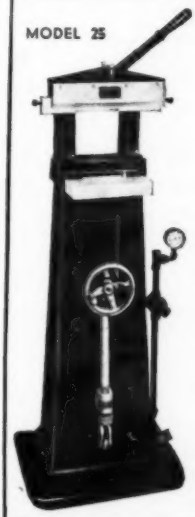

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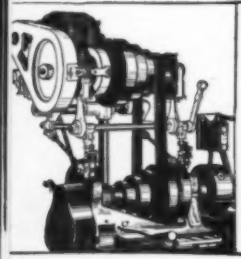

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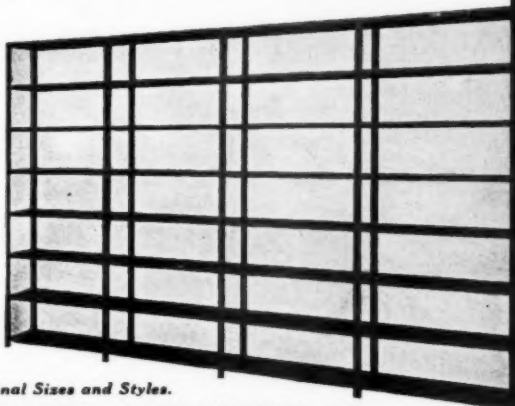

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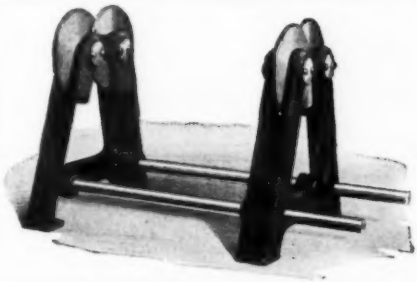

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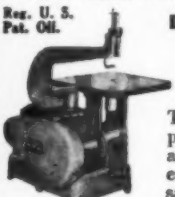

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LeMaire Tool & Mfg. Co., Dearborn, Mich.
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Cincinnati Bickford Tool Co., Cincinnati, Ohio
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Fosdick Mach. Tool Co., Cincinnati, O.
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Barnes Drill Co., Rockford, Ill.
**Boice-Crane Co., Toledo, Ohio**
**Buffalo Forge Co., Buffalo, N. Y.**
**Canedy-Otto Mfg. Co., Chicago Hts., Ill.**
**Delta Mfg. Co., Milwaukee, Wis.**
**Duro Metal Prod. Co., 2649 N. Kildare, Chicago**
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Foote-Burt Co., Cleveland, O.
Fosdick Mach. Tool Co., Cincinnati, O.
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**Chicago Pneu. Tool Co., 6 E. 44th St., N. Y. C.**
**Cincinnati Electrical Tool Co., Cincinnati, Ohio**
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Cincinnati Bickford Tool Co., Oakley, Cincinnati
Leland-Gifford Co., Worcester, Mass.
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**Atlas Press Co., Kalamazoo, Mich.**
**Avey Drilling Machine Co., Cincinnati, Ohio**
**Boice-Crane Co., Toledo, Ohio**
**Buffalo Forge Co., Buffalo, N. Y.**
**Canedy-Otto Mfg. Co., Chicago Heights, Ill.**
Cleereman Machine Tool Co., Green Bay, Wis.
**Delta Mfg. Co., Milwaukee, Wis.**
Foote-Burt Co., Cleveland, Ohio
**Hamilton Tool Co., Hamilton, Ohio**
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**Taylor Sales Co., Milwaukee, Wis.**
**Walker-Turner Co., Plainfield, N. J.**

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Ampco Twist Drill Co., Jackson, Mich.
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Greenfield Tap and Die Co., Greenfield, Mass.
Morse Twist Drill Co., New Bedford, Mass.
National Twist Drill & Tool Co., Detroit, Mich.
Standard Tool Co., Cleveland, Ohio
Union Twist Drill Co., Athol, Mass.
Whitman and Barnes Co., Detroit, Mich.

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**Avey Drilling Machine Co., Cincinnati, Ohio**
**F. H. Ayer Mfg. Co., Chicago Heights, Ill.**

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Columbia VariSpeed Co., Wheaton, Ill.
**Cullman Wheel Co., 1556 Altgeld St., Chicago**
**Drive-All Mfg. Co., Detroit, Mich.**
**Smith Power Transmission Co., Cleveland, Ohio**
**Speedmaster Co., Div. Continental Machines, Inc., Minneapolis, Minn.**
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Turchan Follower Machine Co., Detroit, Mich.
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**Midwest Tool & Mfg. Co., Detroit, Mich.**
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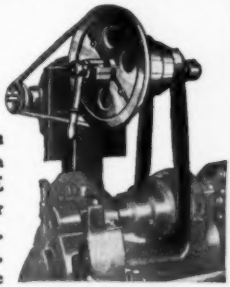

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**Grobet File Corp. of Am., 3 Park Place, N. Y. C.**
Hayes File Co., Detroit, Mich.
**Nicholson File Co., Providence, R. I.**
**Simonds Saw & Steel Co., Fitchburg, Mass.**

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**Grobet File Corp. of Am., 3 Park Place, N. Y. C.**
**M. A. Ford Mfg. Co., Davenport, Ia.**
**Hamilton Tool Co., Hamilton, Ohio**
**Charles L. Jarvis Co., Middletown, Conn.**
**Mall Tool Co., 7742 S. Chicago Ave., Chicago**
**Pratt & Whitney, Hartford, Conn.**
**Severance Tool Mfg. Co., Saginaw, Mich.**
**Strand & Co., N. A., 5001 N. Wolcott, Chicago**

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**M-B Products, Detroit, Mich.**
**Norgren Co., Carl A., Denver, Colo.**
**Sterling Tool Products Co., 357 E. Ohio, Chicago**

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**FLEXIBLE SHAFT MACHS. and EQPT.**
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**Dumore Co., Racine, Wis.**
**R. G. Haskins Co., 623 S. California Ave., Chicago**
**Charles L. Jarvis Co., Middletown, Conn.**
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**Nilson Machine Co., A. H., Bridgeport, Conn.**

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Electric Furnace Co., Salem, Ohio
**Hevi Duty Electric Co., Milwaukee, Wisc.**
**A. F. Holden Co., New Haven, Conn.**
**Stark Tool Co., Waltham, Mass.**

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**Western Tool & Stamping Co., Des Moines, Iowa**

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**Ford Motor Co., Dearborn, Mich.**
**Pratt and Whitney, Hartford, Conn.**
**Scherr Co., Geo., New York, N. Y.**

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**Dearborn Gage Co., Dearborn, Mich.**
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**Pratt and Whitney, Hartford, Conn.**
**Quality Tool & Die Co., Indianapolis, Ind.**
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Sheffield Gage Corp., Dayton, Ohio
L. S. Starrett, Athol, Mass.
Tool Eng. & Mfg. Co., Providence, R. I.

**GAGES, dial**
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**Brown and Sharpe Mfg. Co., Providence, R. I.**
**Federal Products Co., Providence, R. I.**
Sheffield Gage Corp., Dayton, Ohio
L. S. Starrett Co., Athol, Mass.

**GAGES, plug**
Greenfield Tap and Die Co., Greenfield, Mass.
**Pratt and Whitney, Hartford, Conn.**
**United Precision Products Co., 4618 W. Huron, Chicago**

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Farrel-Birmingham Co., Buffalo, N. Y.
Fellows Gear Shaper, Springfield, Vt.
Gleason Works, Rochester, N. Y.
**Michigan Tool Co., Detroit, Mich.**

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**Brown and Sharpe Mfg. Co., Providence, R. I.**
Fellows Gear Shaper Co., Springfield, Vt.
**Michigan Tool Co., Detroit, Mich.**

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**Abart Gear and Mach. Co., Cicero, Ill.**
Boston Gear Works, North Quincy, Mass.
**Chicago Gear Works, 441 N. Oakley, Chicago**
Cragg Gear and Mach. Works, Kansas City, Mo.
General Electric Co., Pittsfield, Mass.
Gleason Works, Rochester, N. Y.
**Hartford Special Machy. Co., Hartford, Conn.**
Horsburgh and Scott Co., Cleveland, Ohio
Illinois Gear and Machine Co., 2144 N. Natchez, Chicago
D. O. James Co., Chicago
Ohio Gear Co., Cleveland, Ohio
Philadelphia Gear Works, Philadelphia, Pa.
**Shaw Box Crane & Hoist Div., Muskegon, Mich.**
Stahl Gear & Machine Co., Cleveland, Ohio
**Taylor Machine Co., Cleveland, Ohio**
Taylor Machine & Gear Co., Cleveland, Ohio

**GEARS, master**
**Michigan Tool Co., Detroit, Mich.**

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Fairbanks Morse Co., Chicago
**Gaston Power Tools, Evergreen Park, Ill.**
General Electric Co., Schenectady, N. Y.
**Harnischfeger Corp., Milwaukee, Wis.**
**Lincoln Electric Co., Cleveland, Ohio**

**GOGGLES**
Safety Equip. & Service Co., Cleveland, Ohio
**Sellstrom Mfg. Co., 615 N. Aberdeen, Chicago**

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See Belt Grinders

**GRINDERS, bench and floor**
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Atlas Press Co., Kalamazoo, Mich.
Baldor Electric Co., St. Louis, Mo.
Brown-Brockmeyer Co., Dayton, Ohio
Clizbe Brothers Mfg. Co., Plymouth, Ind.
Cincinnati Elec. Tool Co., Cincinnati, Ohio
Cutter Machine Co., St. Louis, Mo.
Delta Mfg. Co., Milwaukee, Wis.
Grenby Mfg. Co., New Britain, Conn.
Hammond Machinery Builders, Kalamazoo, Mich.
Hisey-Wolf Machine Co., Cincinnati, Ohio
Hobart Brothers, Troy, Ohio
LaSalle Tool Co., Ottawa, Ill.
Skilsaw, Inc., 5035 Elston, Chicago
Standard Electric Tool Co., Cincinnati, Ohio
Stanley Works, New Britain, Conn.
T. C. M. Mfg. Co., Harrison, N. J.
U. S. Electric Tool Co., Cincinnati, Ohio
Vonnegut Moulder Co., Indianapolis, Ind.
Walker-Turner Co., Plainfield, N. J.
Walls Sales Corp., New York, N. Y.

**GRINDERS, carbide tool**
Baldor Electric Co., St. Louis, Mo.
Carboloy Company, Detroit, Mich.
K. O. Lee and Son, Aberdeen, S. D.
Thomas Prosser & Son, 120 Wall St. N. Y. C.
T. C. M. Mfg. Co., Harrison, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

**GRINDERS, cutter and tool**
Barber-Colman Co., Rockford, Ill.
Brown and Sharpe Mfg. Co., Providence, R. I.
Cincinnati Grinders, Inc., Cincinnati, Ohio
Covel Mfg. Co., Benton Harbor, Mich.
Gallmeyer and Livingston Co., Grand Rapids, Mich.
Grenby Mfg. Co., New Britain, Conn.
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
Hisey-Wolf Machine Co., Cincinnati, Ohio
K. O. Lee and Son, Aberdeen, S. D.
Oliver Inst. Co., Adrian, Mich.
Wm. Sellers and Co., Philadelphia, Pa.
Stanley Works, New Britain, Conn.
Sundstrand Machine Tool Co., Rockford, Ill.
T. C. M. Mfg. Co., Harrison, N. J.

**GRINDERS, disc**
Chas. H. Besly and Co., Chicago
Cincinnati Elec. Tool Co., Cincinnati, Ohio
Cincinnati Machy. and Supply Co., Cincinnati, O.
Clizbe Brothers, Plymouth, Ind.
Delta Mfg. Co., Milwaukee, Wis.
Fitchburg Grinding Mach. Corp., Fitchburg, Mass.
Gardner Machine Co., Beloit, Wis.
Hammond Machinery Builders, Kalamazoo, Mich.
Hisey-Wolf Machine Co., Cincinnati, Ohio
Production Machine Co., Greenfield, Mass.
Ransom Grinding Machine Co., Oshkosh, Wis.
Standard Electrical Tool Co., Cincinnati, Ohio
U. S. Electric Tool Co., Cincinnati, Ohio
Vonnegut Moulder Corp., Indianapolis, Ind.

**GRINDERS, flexible shaft**
See Flexible Shaft Machinery

**GRINDERS, hand**
See Grinders, Portable

**GRINDERS, oscillating**
Boyar-Schultz Co., Chicago, Ill.
Peters Tool Co., Milwaukee, Wis.

**GRINDERS, portable air**
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Independent Pneu. Tool Co., Chicago
Ingersoll-Rand Co., New York City
M-B Products Co., Detroit, Mich.
Madison-Kipp Corp., Madison, Wis.
Onsrud Machine Works, Chicago
Rotor Air Tool Co., Cleveland, O.

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Chicago Pneu. Tool Co., 6 E. 44th St., N. Y. C.
Chicago Wheel & Mfg. Co., 1101 W. Monroe, Chg.
Cincinnati Elec. Tool Co., Cincinnati
Dremel Mfg. Co., Racine, Wis.
Dumore Co., Racine, Wis.
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Gaston Power Tools, Evergreen Park, Ill.

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**Brown and Sharpe Mfg. Co., Providence, R. I.**
**Bryant Chucking Grinder Co., Springfield, Vt.**
Cincinnati Grinders, Inc., Cincinnati, O.
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Landis Tool Co., Waynesboro, Pa.
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Standard Elec. Tool Co., Cincinnati
Sunnen Products Co., St. Louis, Mo.
Thompson Grinder Co., Springfield, Ohio
U. S. Electrical Tool Co., Cincinnati
**Universal Hi-Speed Tool Co., 549 W. Washington, Chicago**

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**Stanley Works, New Britain, Conn.**

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**Cincinnati Electrical Tool Co., Cincinnati, Ohio**
Gardner Machine Co., Beloit, Wis.
**Hammond Machinery Builders, Kalamazoo, Mich.**
Jefferson Machine Tool Co., Cincinnati, Ohio
**Standard Electrical Tool Co., Cincinnati, Ohio**
U. S. Electrical Tool Co., Cincinnati, Ohio
**Vonnegut Moulder Co., Indianapolis, Ind.**

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H. P. Boggis Co., Cleveland, Ohio
**Oliver Instrument Co., Adrian, Mich.**

**GRINDERS, tool post**
**Atlas Press Co., Kalamazoo, Mich.**
**Chicago Wheel and Mfg. Co., 1101 W. Monroe St., Chicago**
**Dumore Co., Racine, Wis.**
**Gaston Power Tools, Evergreen Park, Ill.**
Hisey-Wolf Machine Co., Cincinnati, Ohio
Layth Grinder Corp., Lawrence, N. J.
**Madison-Kipp Corp., Madison Wis.**
**N. A. Strand Co., Chicago**

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**Acme Industrial Co., 210 N. Laflin St., Chicago**
**Eastern Centerless Grinding Co., Hartford, Conn.**
**The Heim Co., Fairfield, Conn.**
**Taylor Machine Co., Cleveland, Ohio**

**GRINDING MACHINES, belt**
See Belt Sanders

**GRINDING MACHINES, surface**
Arter Grinding Machine Co., Worcester, Mass.
Automatic Machinery Mfg. Co., Bridgeport, Conn.
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Blanchard Machine Co., Cambridge, Mass.
**Brown & Sharpe Mfg. Co., Providence, R. I.**
**Bryant Chucking Machine Co., Springfield, Vt.**
**Builders Iron Foundry, Providence, R. I.**
**Cincinnati Grinders, Inc., Cincinnati, Ohio**
Covel Mfg. Co., Benton Harbor, Mich.
**Gallmeyer and Livingston Co., Grand Rapids, Mich.**
**Gardner Machine Co., Beloit, Wis.**
**Grenby Mfg. Co., New Britain, Conn.**
Hanchett Mfg. Co., Big Rapids, Mich.
Heald Co., Worcester, Mass.
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**Reid Bros. Co., Beverly, Mass.**

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**Gallmeyer and Livingston Co., Grand Rapids, Mich.**
**R. K. LeBlond Machine Tool Co., Cincinnati, Ohio**
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American Rotary Tools, 44 Whitehall St., N.Y.C.
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Bay State Abrasive Prod. Co., Westboro, Mass.
Carborundum Co., Niagara Falls, N. Y.
**Chicago Wheel and Mfg. Co., 1101 W. Monroe St.,**
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Macklin Company, Jackson, Mich.
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**Builders Iron Foundry, Providence, R. I.**

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W. O. Barnes Co., Detroit, Mich.
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Millers Falls Co., Greenfield, Mass.
Napier Saw Works, Middletown, N. Y.
**Racine Tool & Mach. Co., Racine, Wis.**
**Simonds Saw & Steel Co., Fitchburg, Mass.**
Spartan Saw Works, Springfield, Mass.
Starrett Co., L. S., Athol, Mass.
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Peerless Machine Co., Racine, Wis.
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**Rasmussen Machine Co., Racine, Wis.**
**Wells Mfg. Corp., Three Rivers, Mich.**

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**Chicago Pneumatic Tool Co., New York City**
Independent Pneu. Tool Co., Chicago
Wodack Electric Tool Corp., Chicago

**HAMMERS, soft**
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Greene-Tweed and Co., New York City
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**Coffing Hoist Co., Danville, Ill.**
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Detroit Hoist and Machine Co., Detroit, Mich.
**Hanna Engineering Works, 1765 Elston Ave., Chg.**
**Harnischfeger Corp., Milwaukee, Wis.**
McCollum Hoist Mfg. Co., Downers Grove, Ill.
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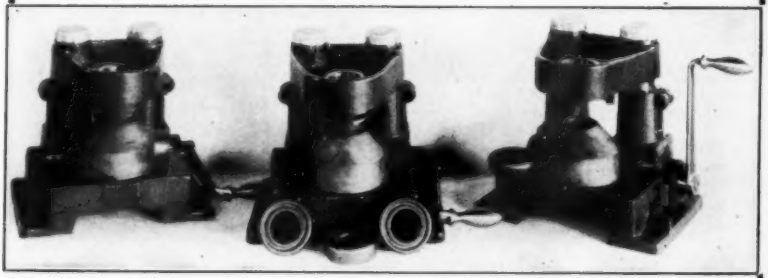

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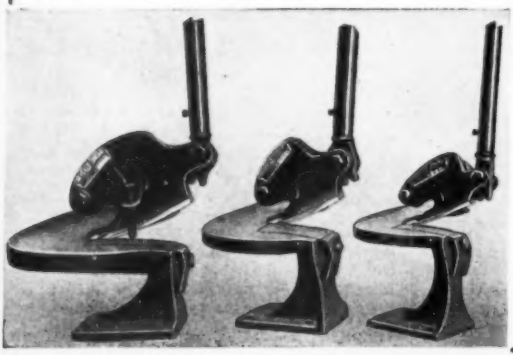

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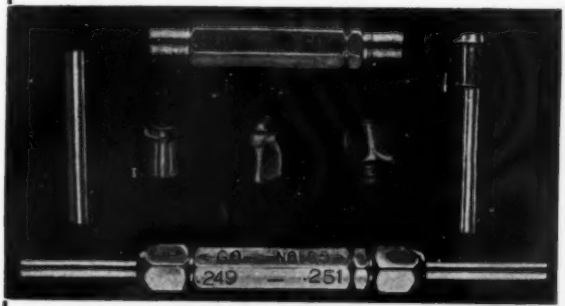


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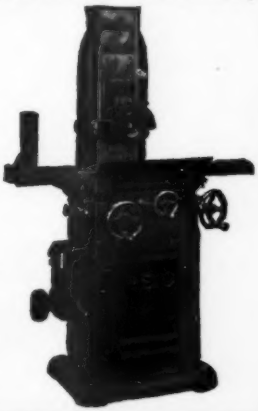

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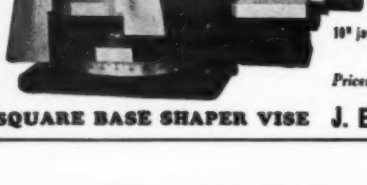

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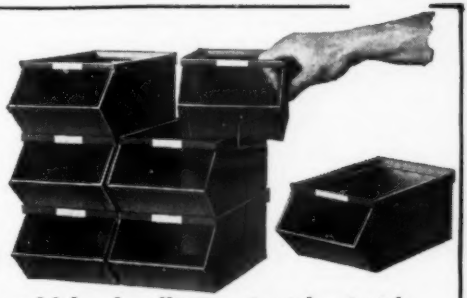

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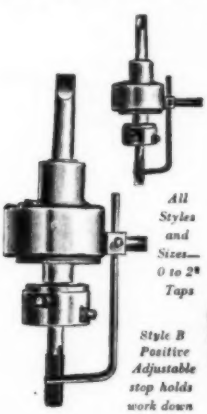

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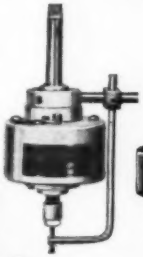

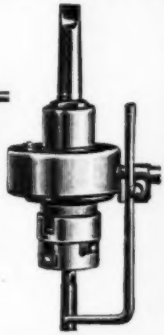

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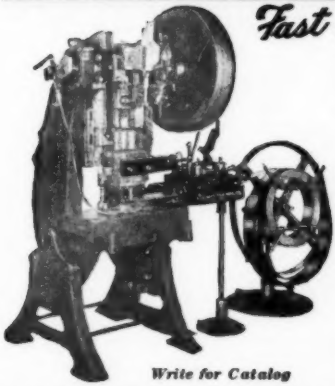

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**Greenerd Arbor Press Co., Nashua, N. H.**
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Lake Erie Eng. Co., Buffalo, N. Y.
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**Federal Press Co., Elkhart, Ind.**
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**Marshalltown Mfg. Co., Marshalltown, Ia.**
Niagara Machine & Tool Works, Buffalo, N. Y.
Rockford Iron Works, Rockford, Ill.
Thomas Machine Mfg. Co., Pittsburgh, Pa.
V. and O. Press, Hudson, N. Y.
Verson All-steel Press Co., 9300 Kenwood, Chgo.
**Zeh and Hahnemann, Newark, N. J.**

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**Geo. Gorton Machine Co., Racine, Wis.**
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**Pratt and Whitney, Hartford, Conn.**
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Blum Tool Co., Los Angeles, Cal.
Coffing Hoist Co., Danville, Ill.
**Owatonna Tool Co., Owatonna, Minn.**
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Dodge Mfg. Corp., Mishawauka, Indiana
**Duro Metal Prod. Co., 2649 N. Kildare Ave., Chg.**
Link-Belt Company, Chicago, Ill.
Maurey Mfg. Co., 2915 So. Wabash, Chicago
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**Vacuum Cup Metal Pulley Co., Detroit, Mich.**

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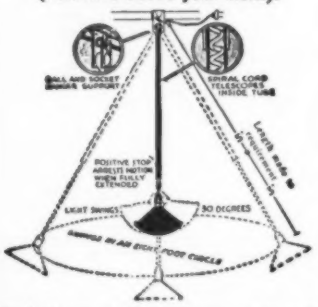
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**Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago**
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**Porter Cable Mach. Co., Syracuse, N. Y.**
**Production Machine Co., Greenfield, Mass**
**Rotor Air Tool Co., Cleveland, Ohio**
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**Stanley Works, New Britain, Conn.**
**Sterling Tool Prod. Co., Chicago**
**Stow Mfg. Co., Binghamton, N. Y.**
**Strand Co., N. A., Chicago**
**Sundstrand Mach. Tool Co., Rockford, Ill.**
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**SAWS, HACK**
See Hack Saw Machines

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Foster Mach. Co., Elkhart, Ind.
Greenlee Bros. and Co., Rockford, Ill.
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Bristol Company, Waterbury, Conn.
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Parker-Kalon Corp., New York City
**Safety Socket Screw Co., Chicago, Ill.**
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**Mall Tool Co., 7742 So. Chicago Ave., Chicago**
Matthews Mfg. Co., Newton, Iowa
**Pratt and Whitney, Hartford, Conn.**
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Hendey Machine Co., Torrington, Conn.
Morton Mfg. Co., Muskegon Heights, Mich.
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Western Machine Tool Works, Holland, Mich.

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**Automotive Maintenance Machy. Co., North Chicago, Ill.**
**Machinery Mfg. Co., Vernon, Cal.**
Sales Service & Mfg. Co., Minneapolis, **Minn.**

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Hanson-Whitney Machine Co., Hartford, **Conn.**
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**Pratt and Whitney, Hartford, Conn.**
Rockford Machine Tool Co., Rockford, Ill.

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**Beverly Shear Co., 3007 W. 110th Pl., Chicago**
**Bremil Mfg. Co., Erie, Pa.**
**Buffalo Forge Co., Buffalo, N. Y.**
**Marshalltown Mfg. Co., Marshalltown, Iowa**
Niagara Machine and Tool Co., Buffalo, N. Y.
Peck, Stow and Wilcox Co., Southington, Conn.
**Stanley Works, New Britain, Conn.**
**Whitney Mfg. Co., W. A., Rockford, Ill.**
**Whitney Metal Tool Co., Rockford, Ill.**

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**Beatty Mfg. & Mch. Co., Hammond, Ind.**
**Buffalo Forge Co., Buffalo, N. Y.**
Cincinnati Shaper Co., Cincinnati, O.
**Excelsior Tool and Machine Co., E. St. Louis, Ill.**
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Libert Machine Co., Green Bay, Wis.
**Marshalltown Mfg. Co., Marshalltown, Iowa**
Niagara Machine and Tool Co., Buffalo, N. Y.
Peck, Stow and Wilcox Co., Southington, Conn.
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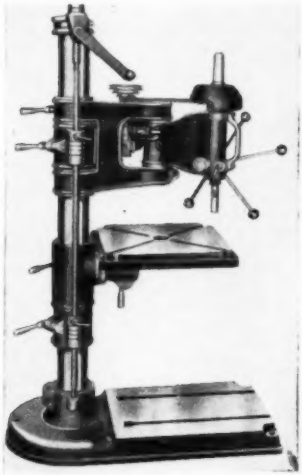

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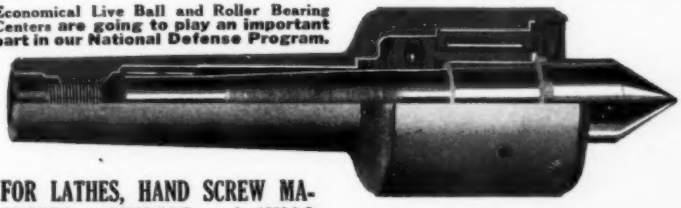

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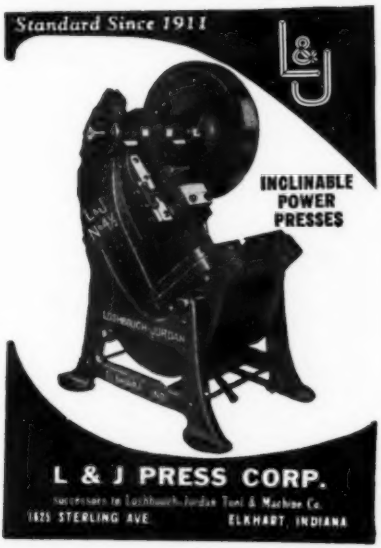
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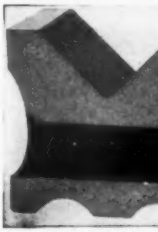

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**VALVES, hydraulic**
**Berkeley Equip. Co., Corry, Pa.**
**Elmes Engineering Co., Chicago**
**Fulflo Specialties Co., Blanchester, Ohio**
**Galland Henning Mfg. Co., Milwaukee, Wis.**

**VISES, machine (Cont.)**
**Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago**
C. B. Hunt and Son, Salem, Ohio
Logonsport Mach. Co., Logansport, Ind.
W. H. Nicholson and Co., Wilkesbarre, Pa.
**Racine Tool & Mch. Co., Racine, Wis.**
**Remco Products Corp., York, Pa.**
**Sundstrand Machine Tool Co., Rockford, Ill.**

**VALVES, hydraulic**
**Berkeley Equipment Co., Corry, Pa.**
**Chas. F. Elmes Engrg. Works, Chicago, Ill.**
**Galland-Henning Mfg. Co., Milwaukee, Wis.**
Hunt and Son, C. B., Salem, Ohio
Logansport Machines, Inc., Logansport, Ind.
**W. H. Nicholson and Co., Wilkesbarre, Pa.**
Oilgear Co., Milwaukee, Wis.
**Racine Tool and Machine Co., Racine, Wis.**
**Sundstrand Machine Tool Co., Rockford, Ill.**
Watson-Stillman Co., Roselle, N. J.

**VENTILATION SYSTEMS**
**C. F. Berg and Co., Boston, Mass.**

**VISES, combination drill and table**
M. P. Heinze Co., Chicago, Ill.
**Modern Machine Tool Co., Jackson, Mich.**

**VISES, machine**
**Armstrong-Blum Mfg. Co., Chicago, Ill.**
**Armstrong Bros. Tool Co., Chicago, Ill.**
**Atlas Press Co., Kalamazoo, Mich.**
**Brown and Sharpe Mfg. Co., Providence, R. I.**
Bryant Engineering Co., Cicero, Ill.
**Chicago Tool and Engrg. Co., 8380 S. Chicago Ave., Chicago**
**Cincinnati Milling Machine Co., Cincinnati, Ohio**
**Graham Mfg. Co., Providence, R. I.**
**Hartford Special Machy. Co. ,Hartford, Conn.**
**K-O Products Co., Benton Harbor, Mich.**
**L-W Chuck Co., Toledo, Ohio**
Martin Tool & Die Works, Springfield, Ohio
**Modern Machine Tool Co., Jackson, Mich.**
**New Britain Tool and Mfg. Co., New Britain, Conn.**
**Plunket Machine Co., J. E., 1823 W. Lake, Chgo.**
**Pratt and Whitney, Hartford, Conn.**
**Procunier Safety Chuck Co., Chicago, Ill.**
**Sheldon Machine Co., 1629 N. Kilbourn, Chicago**
Skinner Chuck Co., New Britain, Conn.
**Yost Mfg. Co., Meadville, Pa.**

**VISES, machinists' bench**
American Scale Co., Kansas City, Mo.
**Atlas Press Co., Kalamazoo, Mich.**
**Brown and Sharpe Mfg. Co., Providence, R. I.**
Cardinal Machine Co., Glendale, Cal.
**Cincinnati Milling Machine Co., Cincinnanti, O.**
**Desmond-Stephan Co., Urbana, Ohio**
**Fray Machine Tool Co., Glendale, Cal.**
Hollands Mfg. Co., Erie, Pa.
**L-W Chuck Company, Toledo, O.**
New Britain Gridley Machine Co., New Britain, Conn.
North Brothers, Philadelphia, Pa.
**Plunket Machine Co., J. E., 1823 W. Lake, Chgo.**
**Yost Mfg. Co., Meadville, Pa.**

**VISES, pipe**
**Armstrong Bros. Tool Co., 308 N. Francisco, Chgo.**
Beaver Pipe Tools Inc., Warren, Ohio
Columbian Vise and Mfg. Co., Cleveland, O.
Erie Tool Works, Erie, Pa.
Ridge Tool Co., Elyria, Ohio
**Yost Mfg. Co., Meadville, Pa.**

**VISES, planer & shaper**
Cincinnati Planer Co., Cincinnati, Ohio
Cincinnati Shaper Co., Cincinnati, Ohio
**Graham Mfg. Company, Providence, R. I.**
**Plunket Machine Co., J. E., 1823 W. Lake, Chgo.**

**VISES, universal**
**Brown and Sharpe Mfg. Co., Providence, R. I.**
Emmert Mfg. Co., Waynesboro, Pa.
**Fray Machine Co., Glendale, Cal.**
**New Britain Tool & Mfg. Co., New Britain, Conn.**
Wesson Company, Detroit, Mich.

**WASHERS**
**Detroit Stamping Co., Detroit, Mich.**
Positive Lock Washer Co., Newark, N. J.
Shakeproof Lock Washer Co., 2500 N. Keeler, Chicago
Spring Washer Institute, Chicago
Thompson-Bremer & Co., 1642 W. Hubbard, Chgo.
**Wrought Washer Mfg. Co., Milwaukee, Wis.**

## Doall Surface Grinder Model "GP"

A new Doall Precision Surface Grinder (Model GP) is announced by Continental Machines, Inc., 1300 S. Washington Ave., Minneapolis.

Base of the machine weighs 815 lbs. and is scientifically ribbed and reinforced for rigidity. The column which carries the spindle has a 30" bearing surface in the base, holding it rigidly in any position. Column of the machine is of true box construction, made of alloyed cast iron containing both chromium and nickel.

The table is also made of alloyed cast iron. All sliding surfaces are carefully hand scraped. Wheel spindle is mounted in precision ball bearings, direct motor driven by special dynamically and statically balanced motor. Spindle is supplied to use standard 7-½" diameter by ½" face wheel. Table movements, both longitudinal and cross, are hydraulically driven. Simplified controls make for easy operation. A built-in dial indicator, registering in "tenths," augments hand wheel feed, enabling the operator to grind to extremely close limits.

Indicator is coupled directly between wheel head and table, giving a direct reading of any movement of grinding wheel relative to work being ground. Table travel is infinitely variable from zero to 50 r.p.m. Cross feed is variable from zero to 150 thousandths at each reversal of table travel. Automatic cross feed movement is provided for wheel dressing. A novel built-in cold fluorescent type lamp provides soft though adequate illumination to the table, which is heplful when bringing the grinding wheel in contact with the work.

Automatic lubrication by means of forced feed filtered oil is provided to all moving parts. Coolant piping, splash guards and coolant return systems are furnished as standard equipment. It is only necessary to couple a coolant pump unit direct to the pipe line for wet grinding operation. The coolant splash guards are readily removed for dry grinding.

## Monarch Bearing Metal

A new bearing bronze, produced for a wide range of bearing and seal applications, has been developed by the Monarch Alloys Co., Ravenna, Ohio.

Known as Monarch Metal, the new bronze is alloyed in various high-lead combinations. Its elements are combined in a hermetically sealed crucible which protects them from contact with furnace gases or oxygen while they are melting, and the resultant alloy is water cooled by means of a secret process.

It is claimed that friction, heat and noise are reduced because hard, abrasive tin and lead oxides are prevented in the melting and casting. Also, that flow of the lead under heat is prevented by better dispersion and nodulation of the lead. Although the lead content is unusually high, Monarch metal is asserted to be superior in hardness and compression resistance.

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Automotive Supply Co., Appleton, Wis.
**Dyer Welder and Engineering Co., Kansas City, Mo.**
**Eisler Engineering Co., Newark, N. J.**
Ergolyte Co., Philadelphia, Pa.
Federal Mach. & Welder Co., Warren, Ohio.
General Electric Co., Schenectady, N. Y.
Giant Grip Mfg. Co., Oshkosh, Wis.
**Harnischfeger Corp., Milwaukee, Wis.**
**Hobart Brothers Co., Troy, Ohio**
**K. O. Lee and Son, Aberdeen, S. D.**
**Lincoln Electric Co., Cleveland, Ohio**
Marquette Mfg. Co., Minneapolis, Minn.
Miller Electric Mfg. Co., Appleton, Wis.
**Pier Equipment Co., Benton Harbor, Mich.**
Taylor-Winfield Co., Warren, Ohio
Una Welding Co., Cleveland, Ohio
Westinghouse Electric and Mfg. Co., E. Pittsburgh, Pa.

**WELDERS, band saw**
**Weldex, Inc., Detroit, Mich.**

**WELDERS, gas**
Air Reduction Sales, New York City
Compressed Industrial Gases, Inc., Chicago
Linde Air Products Co., New York City
Metal and Thermit Corp., New York City
National Cylinder Gas Co., Chicago

**WELDERS, seam**
**Acro Welder Co., Milwaukee, Wis.**
American Elec. Fusion Co., Chicago, Ill.
**Eisler Engineering Co., Newark, N. J.**
Federal Mach. and Welder Co., Warren, Ohio
Swift Electric Welder Co., Detroit, Mich.
Thompson Gibb Electric Welding Co., Lynn, Mass.

**WELDERS, spot**
**Acro Welder Mfg. Co., Milwaukee, Wis.**
American Elec. Fusion Corp., 2610 Diversey, Chgo.
**Armgio Co., Milwaukee, Wis.**
**Eisler Engineering Co., Newark, N. J.**
**Hobart Brothers Co., Troy, Ohio**
Ideal Mfg. Co., Des Moines, Ia.
**Lincoln Electric Co., Cleveland, Ohio**
**Pier Equipment Co., Benton Harbor, Mich.**
Progressive Welder Co., Detroit, Mich.
Swift Electric Welder Co., Detroit, Mich.
Taylor Winfield Co., Warren, Ohio
Una Welding Co., Cleveland, Ohio
**Weldex, Inc., Detroit, Mich.**

**WELDERS, tube**
American Elec. Fusion Corp., 2610 Diversey, Chgo.
**Lincoln Electric Co., Cleveland, Ohio**

**WELDING ACCESSORIES**
**Berkeley Equip. Co., Corry, Pa.**
**Hobart Brothers Co., Troy, Ohio**
**Lincoln Electric Co., Cleveland, Ohio**
**Sellstrom Mfg. Co., 615 N. Aberdeen, Chicago**

**WELDING CONTROLS**
**Lincoln Electric Co., Cleveland, Ohio**
Weltronic Corp., Detroit, Mich.

**WELDING RODS**
**Harnischfeger Corp., Milwaukee, Wis.**
**Hobart Brothers Co., Troy, Ohio**
**Lincoln Electric Co., Cleveland, Ohio**
Marquette Mfg. Co., Minneapolis, Minn.
Una Welding Co., Cleveland, Ohio
Westinghouse Elec. Mfg. Co., E. Pittsburgh, Pa.

**WIRE FORMING MACHINES**
Baird Machine Co., Bridgeport, Conn.
**Nilson Machine Co., A. H., Bridgeport, Conn.**

**WIRE STRAIGHTENING MACHINES**
American Brass Co., Waterbury, Conn.
American Steel and Wire Co., Cleveland, Ohio
**Nilson Machine Co., A. H., Bridgeport, Conn.**
Shuster Co., F. B., New Haven, Conn.
Wickwire Brothers, Cortland, N. Y.

**WIRE-WORKING MACHINERY**
**John Blaner Co., Sharon, Pa.**
**Nilson Machine Co., A. H., Bridgeport, Conn.**
Shuster Co., F. B., New Haven,, Conn.

**WRENCHES**
**Armstrong Bros. Tool Co., 308 N. Francisco, Chgo.**
The Billing and Spencer Co., Hartford, Conn.
**Chicago Pneu. Tool Co., 6 E. 44th St., N. Y. C.**
**Duro Metal Products Co., Chicago**
Peck Stow and Wilcox Co., Southington, Conn.
Plomb Tool Co., Los Angeles, Cal.
Ridge Tool Co., Elyria, Ohio
Trimont Mfg. Co., Roxbury, Mass.
J. H. Williams Co., N.Y.C.

# New Trade Literature

### TANTUNG CUTTING TOOLS

Two new bulletins by Fansteel Metallurgical Corp., North Chicago, Ill., describe Tantung brazed tip and oxy-acetylene welded tip tools. Designs are given along with specifications and detailed instruction for making up the tools.

### SURFACE GRINDERS

Catalog No. 18 is offered by the Blanchard Machine Co., 64 State Street, Cambridge, Mass. It devotes 24 very attractive and convincing pages to a complete description of the No. 18 grinder. There are very many excellent illustrations and a series of photos present numerous typical jobs handled on these machines.

### MOLYBDENUM STEEL

Four splendid new bulletins are offered by Climax Molybdenum Co., 400 5th Ave., New York City. Of these Molybdenum in Steel is self-explanatory, giving detailed information on numerous steel alloys. Another of the bulletins covers Molybdenum in the Foundry, with a lot of very interesting pictures and information on cast alloys. Molybdenum Fundamental Effects in steel devotes 16 interesting pages to a discussion of the advantages and properties of these modern alloys. Molybdic Oxide Briquettes is a 4 page bulletin describing this popular method of obtaining Molybdenum iron and steel alloys.

### BALL BEARINGS

Catalog No. 11 devotes 24 pages to the extensive line of ball bearings made by Auburn Ball Bearing Co., 28 Industrial St., Rochester, N. Y. A considerable amount of interesting and valuable information is included.

### CONE AUTOMATICS

"Six Ways to Step Up Production" is the intriguing title of a new bulletin by Cone Automatic Machine Co., Windsor, Vermont. Six different types of machines are illustrated and described including 4, 6, and 8 spindle Conomatics and 4 and 5 spindle automatics and chucking machines. A new screw machine attachment for cross-milling, and cross-drilling or stamping without stopping the spindle, is illustrated and described.

### DRILLING ANGULAR HOLES

A new 28-page catalog by Watts Brothers Tool Works, Wilmerding, Pa., presents the story of Watts full floating chucks and drills for triangular, square, pentagonal, hexagonal, and octagonal holes in steel, iron, brass, aluminum. A full description of the process is given with considerable useful information on applications.

### DRILLING MACHINES

Two new bulletins by Buffalo Forge Co., 161 Mortimer St., Buffalo, New York, cover the new "RPMster" and Motor Spindle Drills. The bulletins are numbered 3257 and 3285 respectively. Mechanical details of the machines are given together with specifications and full descriptions.

### GRINDING MACHINES

Seven especially attractive bulletins offered by Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Ohio. No. G-455 is devoted to the Hydraulic Universal. In unusually attractive form it presents the advanced features of these versatile grinding machines. Bulletin G-448 covers the 12-inch Hydraulic Universal. M-868 devotes 28 pages to Dial Type Milling Machines in sizes 2, 3, and 4. Bulletin G-453 is a 12-page presentation of the Cincinnati Centerless Lapping Machine. Bulletin 456 covers the No. 2 Centerless Grinder and G-454 introduces Balancing Arbors and Spans. Bulletin G-455 is an interesting story on the use of abrasives for removing and finishing metals. Catalog M-865 illustrates and describes the Vertical Hydro-Tel Milling Machine.

### PRECISION MILLING, BALANCING, TESTING

Three bulletins by Taylor Sales Co., 2330 West Clybourn St., Milwaukee, Wis., present sensitive drilling machines with capacity up to ⅝"; the Taylor Static Universal Balancing Machine and the Taylor Hydraulic Dynamometer.

### WELDING TIMERS

A new bulletin by Weltronic Corp., 2832 East Grand Blvd., Detroit, Mich., is made up in a handsome blue file folder. It gives considerable practical information on the many types of weld timers offered by this company.

### HYDRAULIC RIVETING

Bulletin No. 53 by Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago, Ill., uses 28 pages to present the extensive line of Hannifin Hydraulic Riveting, Punching and Pressing Equipment. There are numerous photographs with a minimum of descriptive text matter.

### PRESS BRAKES

Bulletin JPB-40 by the Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, describes the new line of junior press brakes for forming, bending, coping, notching, and multiple punching.

### GRINDING, POLISHING MACHINES

Catalog No. 5 is a very complete presentation of the Gardner line of grinding and polishing equipment. It includes disk grinding machinery, special grinding machinery, automatic grinders, ring wheel grinders, ball bearing polishing lathes, and abrasive wheels. Considerable interesting and useful information is given on grinding accessories

plete catalog ever issued by this firm and shows many sizes and types of machines and accessory items.

### DISC CLUTCHES

A new bulletin, L-29, is offered by the Conway Clutch Co., 1541 Queen City Ave., Cincinnati, O. It covers series 160, 170, 180, 190, 2160, 2180 clutches, with descriptions of characteristics and tables of dimensions and performance data.

### CENTRIFUGAL QUENCHING MACHINES

Bulletin No. 55 introduces the new centrifugal quenching machine developed by Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago. Illustrations show the theory and operation of the machine and a clear explanation of the procedure is given with descriptions of typical jobs.

### GRINDERS AND MOTORS

Bulletin No. 1003 presents the "B-Line" of ball bearin grinders and buffers made by The Brown-Brockemyer Co., Inc., Dayton, O. These are available in sizes from ¼ to 5 h.

### NAIL, RIVET AND SCREW PRODUCTS

Catalog No. 40 by Hassall Products, Clay and Oakland Sts., Brooklyn, N. Y., presents many examples of nails, rivets, screws and cold forged products in the standard Hassall line. Also it explains the broad service offered by this firm in the production on contract of special items of this kind.

### AIR FILTERS

Bulletin 340 by Logan Engineering Co., 4916 Lawrence Ave., Chicago, Ill., describes in detail the operation of the "Aridifier" which removes moisture, oil and dirt from comprssed air and gas lines by centrifugal force. Application and installation details are given.

### PRECISION JOBBING WORK

Two attractive new bulletins explain the facilties offered by Acme Industrial Co., 210 N. Laflin St., Chicago, for contract precision manufacture, supplementing industrial plant equipment.

### PREFINISHED METALS

A handsome 32-page catalog and several new mailing pieces present the American line of prefinished metals and the advantages of using these products of the American Nickeloid Co., 1311 Second St., Peru, Ill.

### DIE CASTING MACHINES

A new bulletin gives detailed information on the Giant Kippcaster, produced by Madison-Kipp Corp., 207 Waubesa St., Madison, Wis. Another new publication is devoted to the popular Kipp line of air driven grinders.

### POWER TOOLS

Catalog E-41-A devotes about 60 pages to a very complete line of power tools offered by Duro Metal Products Co., 2649 N. Kildare, Chicago. Large illustrations of the tools are given and the items include a broad range of the lighter types of shop equipment, from table saws, grinders, jointers, drill presses, and band saws to lathes, power grinders, sanders, and accessories.

### EYE PROTECTORS

Catalog No. 18 is a new 70-page book including the many different types of industrial eye protectors offered by Sellstrom Mfg. Co., 646 N. Aberdeen St., Chicago. Respirators, safety clothing, gloves, and other industrial safeguards are included.

### SPEED LATHES

A new catalog No. 400 is announced by Schauer Machine Co., 2064 Reading Rd., Cincinnat, Ohio. A number of different types of speed lathes are shown with sectional drawings. A number of typical illustrations are included as well as sectional drawings of holding devices.

### GEAR CUTTING, LAPPING AND CHECKING

Bulletin 859 by the Michigan Tool Co., 7171 East McNichols Road, Detroit, Mich., covers the Michigan Duplex No. 859 Gear Finisher. The No. 860-A and 860-B Rotary Gear Finishers are covered in bulletins bearing the same numbers.

Back Type Crossed-Axis Gear Finishers are described in buletin No. 900.

Bulletin No. 993 is devoted to the Universal Duplex Lapper; No. 995 to the 2-Lap Gear Lapper and No. 991 to the 3-Lap Lapper.

Bulletin 1127-B covers the Gear Speeder of the same model number.

The Side Involute Checker is described in bulletin No. 1124. The 1204 covers the Sine Line Lead Checker.

Sine Line Hob Checking Equipment is pictured and explained in bulletin No. 464.

### METAL CUTTING SAWS

Bulletins 51 and 52 by the Peerless Machine Co., Racine, Wis., cover this line of universal and standard metal cutting saws. Phantom drawings in the former, show the design and functioning of a novel four-sided saw frame. This construction permits using a backing plate for supporting blade which is tensioned in center of frame instead of at the bottom.

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and equipment, in fact the publication is a rather complete handbook on disc grinding. Address Gardner Machine Co., 436 E. Gardner St., Beloit, Wis., for a copy.

**AIR COMPRESSORS**

Bulletin 726 presents much interesting and helpful information on the subject of two-stage motor driven air compressors made by the Chicago Pneumatic Tool Co., 6 E. 44th St., New York City. Many detailed illustrations show all the important design features and leave little to the imagination.

**MULTIPLE SPINDLE DRILLS**

Bulletin AD-112 by the Delta Mfg. Co., 686 E. Vienna Ave., Milwaukee, presents the new Delta Multiple Spindle Drills. These new, modern drills are exceedingly flexible in arrangement and it is a simple matter to provide the exact number of spindles required for any production jobs.

**BENCH PUNCHES**

A handy new front lever bench punch is just one of the many items in the sheet metal working catalog of T. H. Lewthwaite Machine Co., 311 E. 47th St., New York City.

**MILLING FIXTURES**

A new bulletin by Hart Machine Co., 26 Mather St., Dorchester, Boston, Mass. presents the line of milling fixtures and milling heads made by this company.

**TOOL CONDITIONING**

A handsome 40 page catalog explains the unusual service offered by three allied companies:—Master Tool Co., Inc., 5605 Herman Avenue, N. W., Cleveland, Ohio. The Master Chrome Service, Inc., 569 Herman Ave., N. W., Cleveland, Ohio, and the Eastern Cutter Salvage Corp., 30 Littleton Ave., Newark, New Jersey. A full description of the Industrial Chrome Plating is given along with illustrations and descriptions of typical tool reconditioning jobs.

**WHEEL DRESSING TOOLS**

A four-page bulletin presents the Diamond Wheel Dressing Tools offered by the Abrasive Dressing Tool Co., Inc., 1550 Broadway, Detroit, Mich. The different types of tools are illustrated and described and information given on diamond lapping powder, loose diamonds, scribers, boring and training tools.

**SHEET METAL TOOLS**

Catalog No. 14 is a handy new pocket-size 92-page introduction to an unusually extensive line of sheet metal working tools offered by W. A. Whitney Metal Tool Co., 115 Forbe St., Rockford, Ill. Most of the items in the Whitney line are illustrated and descriptions and specifications are given.

**PORTABLE ELECTRIC TOOLS**

Catalog No. 42 is a very attractive presentation of the large line of portable tools made by Skilsaw, Inc., 5035 Elston Ave., Chicago. Many illustrations show typical uses of these tools on everyday jobs. Cutaway sectional drawings reveal the mechanical construction of the tools and a lot of interesting and useful information is included.

**FLEXIBLE SHAFT MACHINES**

Catalog No. 28 in handsome simulated leather cover and loose-leaf binding presents the very extensive line of flexible shafts and equipment, offered by N. A. Strand & Co., 5001 Wolcott Ave., Chicago. It is the most com-


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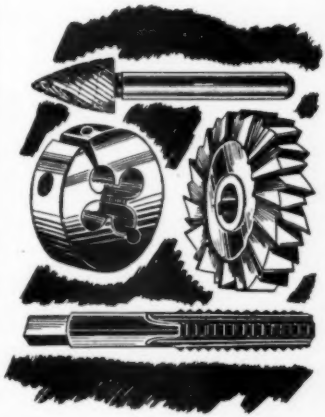

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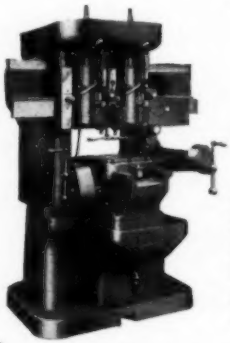

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4-Slide machines, Nilson, (2).
Gear hobbers, G. & E. and Shuchardt & Schutte.
Grinders, 20x72" Landis 3, 3 A; Norton 10x36".
Grinder, Heald No. 70 internal, m.d. serial 3080.
Grinders, No. 55, 60, 65, Heald internal.
Grinder, Heald, No. 72A3, sizematic, m.d.
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Lathes, L & S 16x6 12 sp., selective gd. head.
Lathes, Rahn-Larmon, 16x8, 18x8, 20x10, 20-40-7'-9.
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Shaper, 32" G&E, Invincible late type, m.d.

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Crane, post type, with travelling trolley, used to handle work into and out of lathe.
Lathe, 28" sw.x24' bed Geo. W. Fifield, std. gear c.
Lathe, 54" sw.x16' bed Gleason, std. g. c., back gd.
Wheel Press, 100 ton horiz. J. T. Shaffer.

### FOR SALE BY

**Siegman Machinery Co., Inc.**
**561 W. Washington Blvd., Chicago, Ill.**

Bandsaw, Marvel No. 8, 18x18, m. d., b. b.
Corrugated roll, 48".
Chucking machine, 4 spdl. Gridley model H 4½" m.d.
Grinder, Norton 12x36, motor drive, cylinder.
Grinder, tool & cutter, Cincinnati No. 1.
Grinder, tool & cutter, Wilmarth & Morman, No. 1.
Grinder, Rivett internal.
Grinder, Brown & Sharpe No. 23, cutter grinder, m.d.
Grinder, Landis 1½, universal.
Lathe, N. B. P. 36"x18' L. C. G. double b.g.
Lathe, Carroll Jamieson.
Lathe, 24"x12' Schumacher-Boye, l. c. g.
Mill, Cincinnati No. 3 s.p.d. high power, rap. trav.
Radial drill, 5' American 8 sp. g.b., s. p. drive.
Shear, Niagara power, 8', 14 ga.
Thread cutter, Coulter auto. 6' g. h. 4"x24" s.p.d.
Thread generator, Fellows 4"x12" capacity.

Please send us your inquiries.

**S. M. Regar Machinery and Mill Supplies**
**Tampa, - - - - Florida**

Boring mill, Bickford, s. p. d., horiz., table 33"x60".
Boring mill, Niles 36", 2 swivel heads, vertical.
Boring mill, Niles 30", 1 swivel head, vertical.
Lathe, Bement Miles, l. c. g., 36" factory raising blocks, 44"x22' bed.
Lathe, Gisholt, 24", hole in spindle 6".
Lathe, National 18" production, hole in spdle. 1¾, cone head, (3).
Slotter, Bement Miles 16", circular table.

**Standard Machinery Co.,**
**347 Indiana Ave. Grand Rapids, Mich.**

Ball burnisher, Baird No. 1, double barrel.
Drill, 32" Hoefer, sliding hd., tapping reverse.
Drill grinder, Sellers, 9" capacity.
Gear cutters, Whiton No. 14 automatic, (3).
Lathe, 24" Lodge & Shipley, patent head.
Lathes, Porter-Cable Mfg. (2).
Planer, 36"x36"x10' American, m. d.
Roll formers, Kane & Roach, 2 sets spdles.
Shaper, 25" Smith & Mills, m. d.
Tapper, Anderson No. 40 Dial Feed Auto.
Welder, Thompson Spot 25 KW, foot operated.

# USED AND REBUILT MACHINERY

## FOR SALE BY

### Long Machinery Co.

**852 Summer Street Boston**

New Britain, automatic, 6 spindle, 1" capacity.
Planer, Whitcomb, 30"x10' 2 heads, second belt drive.
Turret lathe, Jones & Lamson, geared head, 4½" hole, chucking equipment only.

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### S. M. Regar Machinery and Mill Supplies

**Tampa, - - - - Florida**

Boring mill, Binsee horiz., table type, 4" spindle.
Cold saw, Higley m. d. No. 27-36", takes blade 33".
Hammer, Lingle 50 lb. power, arranged m. d.
Hammer, Williams White, Yeakley type, 400 lb. pnem.
Screw machines, Model F, Gridley, ¾". (4)

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### Chas. E. Lowe Co.

**174 Pearl Street Hartford, Conn.**

AUTOMATICS
¾"G Gridleys, preloaded, b. b. spindles, 17000 serial. (2)
1¼"G Gridley, Timken r. b. spindles, 10000 serial.
1¼" Cones, 900 serial. (2)
1¼" New Britain-Grid., four spdls. preloaded b. b. (2)
3" and 4½" J. Gridley, s. s.
2½"—3½"—4½" A Cleveland.
Thread millers, Waltham, 3". (2)
National Acmes No. 53 and No. 55, m. d.

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### Foster Machinery Co.

**3982 Bluestone Rd. Cleveland, O.**

Air compressor, Gardner twin, 59 c. f., 220 v., motor d.
Bulldozer, Williams & White No. 4, double end.
Bulldozer, Williams & White, No. 23.
Forging roll, No. O.C. Ajax.
Grinder, No. 60, Heald.
Miller, vertical s. d. Becker, 40" rotary table.
Punch, horizontal Cleveland, Style "T" motor drive.
Punch, Long & Alstatter, 36" throat, 1½" cap. arch jaw, motor drive.
Punch, Cleveland, "Style C", 12" throat. arr. m. d.
Welder, ¾" Butt.

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### Failor-Strafer Machinery Co.

**132 Liberty St., - - New York, N. Y.**

Boring mill, 66" N.B.P. vert., 2 hds., arr. m.d.
Boring mill, 42" Bullard vert., 2 hds. 3 jaw chuck table.
Drill radial, Amer. 3' sens., tapping attachment.
Drill, radial, 3' Mueller, single pulley drive.
Drill, radial, 6' N.B.P. full univ. arr. m. d.
Gas furnace, No. 4 American, door opening 8"x14".
Grinder, Oliver 4 wheel wood tool grinder.
Grinder, 10"x24" Landis pl., self-contained, m. d.
Lathes, 42"x28' Davis, pr. d.; 32"x14' Davis.
Lathe, 26"x10' Bridgeford, 3 step cone, taper attach.
Lathe, 26 x10' Walcott, 3 step cone, d. b. g.
Lathe, 32"x11' American, triple geared, taper att.
Lathes, 2½" & 3" J. & L., arr. bar work & arr. chuck.
Lathe, turret, No. 1A W. & S., chuck equip. arr. m. d.
Miller, 48" Newton continuous rotary, 2 spdle., m.d.
Pipe machines, 8" Wieland, 4" Williams, m. d.
Shaper, 18" Potter & Johnson, universal table.
Shear, 12'x 3/16" cap. Geo. Ohl Power squaring shear.

## FOR SALE BY

### D. E. Dony Machinery Co.

**47 Laurelton Rd., - Rochester, N. Y.**

Bumping hammer, No. 2 Pettingell.
Gear hobbers, No. 1 & 2 Adams.
Mill, 24"x24"x10' Ingersoll, 3 heads, fixed rail, m. d.
Radial drill, 4' Western.

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### Factory & Mill Supply Co., Inc.

**176 Federal St., - Boston, Mass.**

Automatic milling mchc., No 2-M Potter & Johnson, single pulley drive, double table, revolving type, 16 table feeds, 12 spindle speeds. In excellent condition, full particulars upon request.

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### C. R. Daniels

**1514 W. Capitol Drive, Milwaukee, Wis.**

Broach, No. 3, LaPointe belt drive.
Hammer, 50 lb. Mayer power, belt drive.
Lathe, 30"x26' American, cone head, quick change gr.
Radial drill, 3' Cincinnati Bickford, gear box drive.
Welder, 200 amp. Lincoln, portable engine driven.

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### Ogden R. Adams

**264-6 State Street Main 6374-5**
**Rochester, New York**

FOR IMMEDIATE DELIVERY
Press, No. 4 Consolidated, open back inclinable.
Press, No. 2 Bliss "Stiles" punching.
Radial drill, 4' Western, triple geared.
Shapers, 20" Walcott, single pulley drive through g. h.
Shaper, 16" Stockbridge, single geared.

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### Nelson Machinery Co., Green Bay, Wis.

Brake, Keene 10' Cornice, No. 114.
Compressor, 1 R Imp. 12x12, 7½x12 Duplex 327, c.f.m.
Drill, 28" Barnes, sliding hd., H.W.L.&G. p.f., bd.
Gear cutter, Reynolds 18" spur & spiral.
Hoist, 6 ton V & T with trolley.
Planer, Lodge & Davis 24x24x6, belted.
Punch, Reade, 36" throat, plain, m.d.
Roll, Doty, with 3, 7"x6'4" hand operated rolls.
Shear, Lennox circular cutting and beveling, belted.
Turret, Conradsen 26"x8', 3" hole.

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### The Elyria Belting & Machinery Co.

**Elyria - - - - - Ohio**

Compressor, Sullivan angle compound, 780 cubic feet, finger valve type.
Radial drill, 3' Morris.
Gear hobbers, No. 2 Barber-Colman.
Grinder, 30" Diamond face, motor dr.
Header, No. 00 Manville DSSD, 1½" stroke.
Lathe, 28"x16" Walcott, q.c.g.
Millers, No. 1 and 3 Kempsmith universal.
Shears, Stoll, 6'x3/16"; 10'x14 ga.

# USED AND REBUILT MACHINERY

## Lang Machinery Company 28th St. & A. V. R. R. Pittsburgh, Pa.

Air compressors, Ingersoll-Rand XB-2, 600, 888, 1200 & 1500 cu. ft. 100 lb. pressure, motor drive.
Air comp., W J-3 Sullivan, angle comp., 468 c. f.
Air comp. 14"x12" Ing. Rand "ER-1"., 464 c. f.
Bolt cutter, 1" Landis, 1½"-3" Acme, sgl. hd., b. d.
Bolt cutters, 1" Acme, Landis hds., 2 & 3 spdl.
Bolt cutter, 2" Acme, Landis head, b. g , b. d.
Boring mill, 30" Bullard, threading attach., s. p. d.
Boring mill, 36" Bullard rapid prod., s. p. d.
Boring mill, 42" Bullard, 2 swivel heads, s. p. d.
Boring mill, 42" Colburn, grd. fds. 2 hds., s. p. d.
Boring mill, 52" Bausch, geared feeds, d. c., m. d.
Boring mill, 72" Niles, 2 heads, fric. feed, b. d.
Boring mill, 10' Niles, 2 heads, belt drive.
Boring mill, horiz. 3½" bar Binsee, knee type.
Boring mill, horiz. 3½" bar D & H, floor type.
Boring mill, horiz. 5" bar Barrett, b. d.
Boring mill, horiz. 6½" bar Niles, floor type.
Buffer and polisher, 7½ h. p. Marschke, 220/3/60.
Crane, 5 ton Shaw 50' span, 3 motors, d.c.
Drill, radial, 2' Mueller, t. a., m. d.
Drill, radial, 4' Niles-Bement-Pond, t. a., m. d.
Drill, radial, 4' Bickford, t. a., m. d.
Drill, radial, 6' Cincinnati-Bickford, t.a., m.d.
Drills, upright, 14" to 32", belt drive & m.d.
Drill, No. 1 Avey, Sens., m. d.
Drill, No. 3 Avey sgl. spdl., 12" o. h., b. d.
Drill, upright 36" Snyder, p. f., b. d.
Dividing head, 20" diameter.
Gear cutter, 48"x12" Gould & Eberhardt, s. p. d.
Gear hobber, No. 12 Barber-Colman, s. p. d.
Gear hobber, No. 2 S & S, cap. 36"x12", m.d.
Gear planers, bevel, 54" Newark, m. d., (2)
Gear cutters, spur, 84" Newark, m. d. (2)
Grinder, Dillon dbl. end, 7½ h. p., 220/3/60/1750 r. p. m.
Grinder, disc, 18" Diamond, dbl. end.
Grinder, surface, 6"x10"x36" Norton, hydr. fd., m.d.
Grinder, surface, No. 1 W & M, b.d.
Grinder, plain cyl., 12"x96" Landis, b. d.
Grinder, No. 2 Van Norman, b. d.
Grinder, No. 60 Heald, b. d.
Grinder, tool & cutter, Cin., table 24"x3", b.d.
Grinder, internal cylinder, No. 5 Landis, b.d.
Grinder, 7½ h. p. Stand. Elec. Co., dbl. end, 220 v., d.c.
Hammer, 50-lb. Bradley upright strap.
Hammer, 100 lb. Bradley cushion helve belt drive.
Hammer, power, 300-lb. Bradley upright helve.
Hammer, power, No. 4 Beaudry, b. d.
Hammers, steam drop, 1000-lb. to 8000-lbs.
Keyseaters, M. & M. No. 5—2½".
Keyseater, No. 3½ Baker, stroke 26", m. d.
Lathe, 13"x6' South Bend, p. c. g., b. d.
Lathe, 14"x10' Cincinnati, q. c. g , b. d.
Lathe, 16"x6' Rockford, s. b. g., semi-q.c.g., b. d.
Lathe, turning, 20"x8' Prentice, d.b.g., p.c.g., b.d.
Lathe, 16" Bradford grd. head, m.d.
Lathe, 16"-24"x8' South Bend gap lathe, q.c.g., b.d.
Lathe, 18"x8' South Bend, p.c.g., s.b.g., b.d.
Lathe, 20"x14' Bradford, p.c.g., b.d.
Lathe, 20"x10' Johnson, p.c.g. s'b.g., m. d.
Lathe, 20"x10' Monarch, q.c.g., d.b.g., b.d.
Lathe, 20"x10' Hamilton, grd. hd., q.c.g., s.p.d.
Lathe, 22"x16' Bradford, q.c.g., d.b.g., b.d.
Lathe, 24"x10' Bradford, q. c. g., t. a., b. d.
Lathe, 26"—48"x18' McCabe 2-spdl., int. dr., b. d.
Lathe, 27"x11' Le Blond, grd. hd., q.c.g., d.b.g., m.d.
Lathe, 27"x12' Putnam, q. c. g., b. d.
Lathe, 28"x14' Schumacher & Boye, p. c. g., t. a., b. d.
Lathe, 30"x14' Schumaker & Boye, q.c.g., b.d.
Lathe, 32"x16' Schumacher & Boye, p.c.g., d.b.g., b.d.
Lathe, 36"x18' American, p. c. g., t. a., b. d.
Lathe, 36"x26' 6" New Haven, p. c. g., b. d.
Lathe, 40"x16' Fifield, trip. grd., int. face plate dr.
Lathe, 42"x20' Springfield trip. grd., p. c. g. b. d.
Lathe, gun boring, 2 bar, cap. hole 12"x40', m. d.
Lathe, geared head turning, 36"x50' LeBlond, m. d.
Lathe, 46"x17'6" Pond, p.c.g., triple grd., b.d.
Lathe, 54"x21, Detrick & Harvey, t.a., b.d.
Lathe, turret, 18" Reed, p.c.g., h.s., 1½", b.d.
Lathe, turret, Gisholt, 21", h.s., 3", m.d.
Lathe, turret, 24"x24" Jones & Lamson, s. p. d.
Lathe, turret, 14" Garvin, h. s., 1½", b. d.
Lathe, turret, No. 4 Bardons & Oliver, h. s., 1½", b. d.
Lathe, turret, tilted, No. 2 Woods, b. d.
Lathe, turret, Gisholt 24", h.s., 5", m.d.
Miller, duplex, 36"x10' Ingersoll, m. d.
Miller, 24" Cincinnati, auto. duplex, b.d.
Miller, plain, No. 0 Steptoe, table 26½"x8½", b. d.
Miller, plain, No. 2 Cincinnati, table 34½"x10", b. d.
Miller, plain, No. 5-C Becker-B., tbl. 10"x60", b. d.
Miller, univ. No. 3 Garvin, div. head, b. d.
Miller, universal, No. 4 B & S, b.d.
Miller, vert., No. 2 Becker, table 18"x8½", m. d.
Miller, vert., No. 4 Becker, b.d.
Miller, Vert. Taylor & Fett.
Miller, universal, No. 1-A B & S, m.d.
Miller, prod., Gooley & Eddund, table 24"x8", b. d.
Miller, univ., No. 0 Kempsmith, table 29"x8½", b. d.
Miller, univ., No. 2 Brown & Sharpe, div. head b. d.
Miller, univ., No. 2-B Hendey Norton, tbl. 45"x10", b.d.
Miller, slab, 30"x24"x12 Ingersoll, adj. rail, m.d.
Vertical attach., for No. 5 grd. hd. Cincinnati miller.
Pipe machines, Landis ⅛" to 2", belt drive, (2).
Pipe machines, No. 304-B, Oster, m. d.
Pipe machines, 6" Landis gear box a. c., m. d.
Pipe machine, No. 308-B Oster, m. d.
Pipe machines, 8" Williams, 2½" to 8" motor drive.
Planer, openside, 36"x36"x12' Cleveland, 3 hds. m. d.
Planer, 36"x36"x10' Cin., 2 heads, m.d.
Planer, 36"x36"x11' Sellers, 2 heads, b. d.
Press, arch, No. 52 Toledo, str. 4½", m. d.
Press, coining, ELG, 4 Ferracute.
Press, No. 20 Bliss O.B.I., str. 3", m.d.
Press, No. 87 Bliss foot lever, stroke 1½".
Press, dbl. crank, Stoll 79-D, 72"x26", m. d.
Press, No. 95 Bliss, dbl. crk., str. 3½", m. d.
Press, No. 18 Bliss o. b. i. str. 1½" d. f., flywheel type.
Press, No. 5 Toledo o. b. i. str. 2", flywheel type.
Press, trimming, No. 2 Billings & Spencer, 80 tons.
Press 200 ton W-S-M Hyd. Tire. betw. uprs. 44", b. d.
Press, wheel, 300 ton Chambersburg, m.d.
Profilers, Nos. E3 and E4, Keller, motor drive.
Press, perforating, No. 5 V & O. 4" str., dbl. crk., b.d.
Press, hydraulic, forging, 1000 ton Morgan.
Pump, Aldrich triplex, 75 gal. 2000 lb., m. d.
Punch & shear, No. 53 Hendey & Whitt. comb., b.d.
Punch, lever, No. 58 Niagara, 36" throat.
Roll, bending, 7'x8", Pyramid Type, b. d.
Saw, band Type JM Laidlaw, cap. 6", m. d.
Screw machine, ⅝" Cleveland, m. d.
Shapers, 16", 20", 24" & 28", belt or motor drive.
Shear, alligator, No. 61 Carlin, 3" round high knife.
Shear, Alligator, No. 7 United Eng. & Fdy. Co.
Shear, squaring, No. 6-E Niagara, cap. 72"x½", m. d.
Shear, plate, 10'x¾" United, gap 15", m.d.
Shear, rotary, No. 10 Quickwork, 14 ga. 60" throat.
Slitter, gang, No. 2 Waterbury-Farrell, Winder, b. d.
Slotter, Newton, 12", table 30" dia., b.d.
Slotter, 20" Sellers, table 45" dia., b. d.
Straightener, No. 1 Kane & Roach cap., ⅜" rd. m. d.
Straight'er, strip & cut., No. 1 Schuster, 2½"x½", m.d.
Rotary table, 24" diameter.
Welders, 200 amp Gen. Elec.—300 amp. Lincoln.
Welder, butt type, 60 Federal, 65 K.W.

# USED AND REBUILT MACHINERY

## FOR SALE BY

### Riverside Machinery Depot
**255 St. Aubin Ave., - Detroit, Mich.**

AVAILABLE

Planer, 24"x24"x8' Cincinnati.
Planer, 30"x30"x18' Gray, 2 heads.
Tool Grinder, No. 2 Sellers universal.
Drill, Rockford h. d., No. 5 taper.
Grinder, No. 6 Gardner, m. d., 26" discs.
Honing machine, Hutto 2-spindle, m. d.
Over 300 machines available.

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### Alex Zeeve
**2282 Woolworth Bldg., New York, N. Y.**

Drill, radial, 4' Dreses, gear-box, m. d.
Flanger, 9" McCabe pneumatic, lot of die-blocks.
Keyseaters, No. 6A Mitts & Merrill, arranged m. d.
No. 2 & 1 Baker; No. 1 Davis, all equipped.
Lathes, engine, 53"x34' Nicholson-Waterman, geared faceplate, taper; 39" (raised from 29")x20' Rahn-Mayer - Carpenter semi-q. c.; 24" x 16' Whitcomb-Blaisdell q. c., 4 step, d.b.g., taper; 16"x6' Walcott g. h., q.c., spd.; others.
Saws, No. 8 Marvel metal-cutting band, m.d.; 6"x6" Avey "Millband", arr. m.d.; No. 18 Atkins, arr. m. d.; others.
Shapers, 26" Niles, b. g. c.; 30" Whipp, b.g. c.; others.
Turret lathes, 2½"x26" Pratt & Whitney g.h., spd.(with crossfeeding turret); No. 0 Foster hand screw machine, bar feed, collets.
SPECIAL No. 16 Pels tr. comb. ironworker arr. m.d.

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### Wm. C. Johnson & Sons Machy. Co.
**1211 Hadley St., St. Louis, Mo.**

Air compressors, 15 in stock.
Bolt threaders, 1", 1½" & 2" Acme.
Boring mills, 6'—8'.44" Niles.
Boring mill, King 24", turret head.
Broach, 3A La Pointe of Hudson.
Drill, Natco 13 spindle, No. 1 taper.
Drill, No. 2 Fox, 6 spindles.
Drill, Moline hole hog, 5-sp. No. 4 Morse taper.
Drill, radial, 4' Fosdick; 3½' Mueller, 3' Reed-Prentice.
Drill, radial, 3' Cincinnati Bickford.
Drills, radial, Drillmaster, new.
Gear hobber, No. 3 Adams.
Grinders, 10"x30" and 6"x18" Landis.
Hammers, 300 lb. Beaudry, 75 lb. Bradley, 50 & 100 lb. Little Giant.
Lathe 15"x6' LeBlond, quick change g., taper attach.
Lathes, 16"x8' Greaves Klusman, q. c. g.
Lathe, 18"x10' South Bend, quick change gear.
Lathe, 20"x10' Cisco, g. h., t. a., like new.
Lathe, 24"x14' Lehman, quick change gear.
Lathe, 32"x14' Schmacher & Boye.
Miller, Cin. production type, 57"x11" table.
Miller, No. 1½ American.
Miller, No. 2 LeBlond plain.
Miller, No. 3 Cincinnati plain.
Miller, No. 2M Rockford universal.
Miller, 2½ Rockford universal.
Pipe machines, 2"—4"—6"—8"—12"
Pipe machine, 2" Landis.
Planer, 30"x30"x14' Cincinnati.
Press, 92 B Toledo double crank.
Presses, Nos. 2, 3 & 4 Marshalltown.
Presses, 3, hydraulic pump & accumulator.
Roll, plate straightening, H. & J. No. 2, like new.
Shapers, 12"—16"—20"—24".
Punches, shears, bulldozers.
Testing machine, 100,000 lb. Riehle.
Toggle press, 407 A Bliss.
Large stock guaranteed electric motors. Any size.

## FOR SALE BY

### B. D. Brooks Co., Inc.
**119 Broad St. Boston, Mass.**

Sheet metal working machinery, hand and power.
All types of new and reconditioned equipment.
Apron brakes, press brakes, shears, folders.
Bending rolls, corrugating rolls, forming rolls.
Punches, beaders, rotary machines, stakes, etc.

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### R. S. Armstrong & Bro. Co.
**676 Marietta St., N. W., - Atlanta, Ga.**

Bandsaw, 26" Crescent, b. d.
Bolt machine, 2½" Landis, sgl. b d.
Blower, No. 8 Buffalo Vol. B. b. d.
Compressor, 9x8, 12x10, I-R horz. b. d.
Compressor, 10x10 CPT, horz. b. d.
Compressor, 17x9-3/4x12, Sullivan Class W-J3, b.d.
Drills, 20" sta. hd. Silver, b.d.
Drills, 21" & 28" sl. hd. Aurora & Norton, b.d.
Grinder, Cincinnati No. 1 cutter & tool, b.d.
Hammer, 25 lb. Little Giant, power, b. d.
Hammer, 1100 lb. Erie, Steam.
Keyseaters, No. 2 Davis, m. d. No. 2 M. & M., b. d.
Lathe, 13"x8, Davis, q.c.g., d.c., m.d.
Lathe, 14"x8' Rockford, q c g., cone drive.
Lathe, 18"x16" Lodge & Shipley, open grd. hd., m. d., t. a.
Lathe, 18"x24' Bradford, l.c.g., t.a.
Pipe machine, Curtis & Curtis, 2½" to 8", b.d.
Planer, 30x30x10 Wheeler, b.d. open hd.
Shear, Thompson bevel patch, b. d.
Shear, No. 2 Bethlehem circle, b.d.
Welder, Ideal, spot, 7½ KW.
Woodworker, Northfield.

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### Fuchs Machinery & Supply Co.
**1102-4 Farnam St. Omaha, Nebraska**

Broach, No. 3B La Pointe.
Compressor, 12x10 Ing Rand 355' ERI., 220-3-60 m.d.
Drill, 2 spdl. Henry-Wright, 18" overhang.
Drill, 3' American radial, s. p. d.
Drill, Barnes 4 spdl. 20" with indi. belted m. d. each spdl. 220-3-60.
Drill, Barnes 4 spdl. 16" with tapping attach., rt. angle b. d., Sliding hds., auto. power feeds.
Flanger, No. 407 Niagara, combination circle shear and flanger, several sets flanging rolls, motor drive, 220-3-60, like new.
Gear shaper, No. 6 Fellows.
Grinder, No. 17 Besley disc, belt drive.
Grinder, Micro internal cylinder, m. d.
Grinder, No. 60 Heald cylinder.
Grinder, pedestal 7½ h.p. U. S. B. B.
Lathe, 30"x17' Lodge & Shipley, q.c.
Lathe, turret, No. 3 Bardons Oliver back geared.
Lathe, 21" Gisholt turret, 2½" hole.
Lathe, turret, Amer. 30" b.g., q.c., cone dr. serial 41018.
Lathe, turret, 7 & L 34x36, gd. hd., m.d., serial 8092.
Lathe, turret, Libby 18", gd. hd, 3½" hole in spindle, m.d., serial 869.
Lathe, turret, Millholland cone drive, b. g., f. h., 1½" power feed turret No. 556.
Lathe, turret, Woods plain cone, 1" cap. power feed to turret, No. 12758D.
Miller, No. 1½ B & S universal cone drive.
Nibbler, No. 1 Campbell, 3/16 pedestal, b.d.
Press, No. 54 DAG Ferracute, d.a. cam.
Roll, 5'4" dia., belt drive.
Saw, 9x9 Peerless hack, m.d.
Shaper, 24 G. E., Turner drive, rebuilt.
Shear, No. 9126 B Niagara, 10', ⅜" 18" gap.
Shear, and flanger, No. 407 Niagara, ¼".
Shear, No. 2 Ryerson serpentine, m.d.
Shear, 5/8" Kling rotary splitting.
Slotter, 16" Putnam, 27" table.
Welder, 30 KW Federal spot, foot operated.

# USED AND REBUILT MACHINERY

## FOR SALE BY

### Economy Machinery Company, Inc.

**428 E. Pearl St., Cincinnati, Ohio**

Band saw, Atkins No. 3 metal, band.
Drill, Aurora 3 spdle., many single spindles up to 32".
Hack saws, shears, sq. folders, brakes, motors and miscellaneous supplies.
Lathes, Walcott 26x10'. q.c.
Lathe, Amer. 16x6-18x6', cone drive; 22x11', others.
Planer, 24x24x6'.
Press, Bliss 3½; Robinson 2".
Punches, shears.
Shear, Lennox, ¼" capacity.
Shears, Pettingell.
Turret lathe, B. & O. No. 6.
Turret lathe, J. & L., 2½x3x36.
Turret lathes, Acmes 5/8¼, and 14", others.
Prompt attention to inquiries.
Established 1888.

## FOR SALE BY

### Davis Machinery Company

**1-3-5 So. St. Clair St. Toledo, Ohio**

Grinder, No. 2 W. & M., surface, belt drive.
Lathe, 26"x 48" x18' McCabe 2 in 1.
Lathe, 21x8' LeBlond hy. duty, q. c. g.
Lathe, 20"x12' Whitcomb-Blaisdell.
Lathe, 48"x10'6" Bradford std. chg. gear.
Lathe, 32"x12' H. S. & G, q.c.g.
Lathes, turret, No. 3 & No. 9 Foster, motorized.
Mill, No. 1½-B Sp. K&T uni, complete, m.d.
Mill, No. 29 Ohio uni., complete, cone drive.
Mill, No. 1-A plain K&T single pulley drive.
Press, No. 75 Toledo open back, geared.
Saw 6x6 Peerless shaping motor dr.
Screw machines, 2½ & 3½ Gridley sgl, spdl. m. d.
Shapers, 20" & 24" G&E crank, b. gd. cone dr.
Thread miller, No. 3 Lees Bradner. motor drive.

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## Marr-Galbreath Machinery Company

**57 Water St., Pittsburgh, Pa.**

Air compressor, 9x8" Ing-Rand., ER-1.
Air compressor, 6x6" Duplex, Curtis, m.d.
Air comp., 676 cu. ft. Ing-Rand, XRE, 3/60/440.
Blowers, (furnace) No. 2 Knight; No. 3 American.
Blower, pressure, No. 11-PB Am. 14375 cfm., m. d.
Boring mill, 30" Bullard vert., threading attach., b. d.
Boring mill, vert., 30" King, tur. hd., s. p. d.
Brake, crimp and corrugating, 10'x16 ga. Keene.
Brakes, apron, 10'x1/8" & 8'x12 ga., Chgo.
Brakes, apron, 8'x16 ga. Tuttle, hand.
Die filling machine, No. 2 Cochrane-Bly.
Drill, hvy. duty, 24" Mechanics, No. 5 MT, m. d.
Driller, horiz., 6 spindle Nat'l. Acme, No. 2 chucks.
Drills, radial, 3' Dreses, Simplex, cone.
Drills, gang, 3 and 4 spindle, 1 to 4 MT.
Exhauster, No. 35 Buffalo, outlet 12x14", m. d.
Fan, ventilating, 24" American, m. d., 1/60.
Forging machine, 1" Ajax, cont. motion, m. d.
Forging mach., 1" Nat'l cont. mot. Grip Wedge, m. d.
Forging machine, 1½" Acme, all steel, side shear.
Gear pinion, No. 3 Sloan & Chase, auto. bench.
Grinder, No. 2 Wilmarth & Marman surface, b.d.
Grinder, drill, 2½" Oliver, m. d.
Grinder, portable surface, No. 6-OA, motor, 3/60.
Grinder, univ. C. & R. No. 3 B. & S.
Grinding spindle, Excello No. 39, bracket 5002.
Hack saw, No. 5 Marvel, cap. 6x6", belt.
Hack saw, No. 4 Economy, cap. 8x8", m.d.
Hack saw, 6x6" Peerless, for m.d.
Hammers, 80 lb. Boss, No. 2, with dies, belted.
Hammer, 50 lb. Lingle upright power, belted.
Hammer, 60 lb. Bradley horiz. helve. b.d.
Hammer, 800 lb. sgl frame, steam.
Hammers, S. F., steam, 1100 & 1500 lbs.
Hammer, 2500 lb. Erie, Arch frame, steam.
Hammer, 3000 lb. Chbg. steam forging.
Hammer, 400 lb. Bliss board drop (rebuilt).
Hammer, 1000 lb. Chbg. steam drop, double frame.
Hoists, Canton No. 1 portable.
Hoists, 10-ton Euclid, 3/60/220 (2).
Lathe, 11/16"x4' Artisan, q. c. g., s. p. d.
Lathe, 14"x6' Mullins-Edlund, q. c. g., t. a., m. d
Lathe, 16"x6' Advance, chuck, cone.
Lathe, 16"x8' So. Bend, gap type, cone dr.
Lathe, 16"x8' Prentice p.c.g., cone.
Lathe, 17"x8' LeBlond, q. c. g., cone.
Lathe, 18"x8' Hendey, taper att., m.d.
Lathe, 18"x8' S. B. & E., chuck, t. a., cone.
Lathe, 20"x8' Amer. 4 speed hd., t.a., s.p.d.
Lathe, 20"x10' Sebastian, g. h., motor drive.
Lathe, roll, 44" Hyde Park, m. d.
Lathe, 36"x20' Springfield, m. d., 230 v. d. c.
Marking machine, No. 3 Noble & Weatbrook.
Miller, No. 0 Steptoe, pl. index hd., m.d.
Miller, No. 33 Knight, duplex, s.p.d.
Miller, No. 3 Rockford, hand, belt.
Miller, No. 3½ Fox, plain power feed, c.s.
Miller, vertical, No. 4-B, Becker, belt or m.d.
Motors, 15 h. p., West., 3/60/220—440/870 rev.
Motors, 25 h. p., Allis-Chalmers 3/60/220/650 rev.
Motors, 30 & 40 h.p., West., CS. 3/60/220/870 rev.
Nailing machine, No. 6 Morgan, 8-track, m. d.
Nibbling machine, No. 1 Campbell, 6" thr. 3/16".
Nibbling mach., Gray 30" tht., cap. 3/16", m.d.
Pinion cutter, No. 3 Sloan & Chase, capacity 1x1".
Pipe machine, 4" Williams, cap. ½" to 4", m. d.
Pipe machine, 8" Jarecki, cone or m. d.
Pipe machine, 18" Wieland "Standard", m. d.
Pipe machine, 402 Ost., motor 1/60., 2".
Pipe & nipple mach., 2" Landis dbl. hd., b.d.
Planer, 26"x26"x8' Niles, 1 hd., belt m. d.
Press, foot, Lewthwaite, wt. 400 lb., (4).
Press, Horn, McSheery, steel, 1½" str., Wt. 1000 lbs.
Press, horn, No. 16½ Bliss, plain, stroke 1½".
Press, punch, No. 94 Consolidated, plain.
Press, punch, P-3 Ferracute, plain.
Press, punch, Hydr. 150 ton chbg str., m.d.
Press, sgl. crank, 50½ Toledo, str. 6".
Punch, S. E., 36" Cleve. E.F. 1¼x1", A. J., dies.
Punch & shr., comb., No. 5 Buffalo, hand, cap. ½"x1".
Punch & shear, S. E., 6" th., No. 3 L. & A., rapid a.
Punch, state & riveter, 72" Wickes, 7/8" x1", s.p.d.
Punch, state & riveter, 50" Whiting, No. 6, s.p.d.
Riveter, 3A, h. d., cap. 5/16", high speed, s.p.d.
Riveter, 103 Grant, m. d., 3/60/220 v., cap. 5/16".
Rolls, 30"x6" United, 2-rolls (for leather).
Saw, metal band, No. 4 Atkins, cap. 12x18", m.d.
Saw, friction, No. 0 Ryerson, 24" blade, m.d.
Shaper, 15" Blount, single geared.
Shaper, 16" G&E. (old model.) cone.
Shaper, comb., 7" Rhodes, horiz. 3½" vert. str.
Shapers, 21" Averbeck & American, cone.
Shapers, 24" Milwaukee & American, cone.
Shear, bar, No. 3 United, 24" blade, cap. 3½" sq., m. d.
Shear, 60"x½" L. & A. 5" gap, belt.
Shear, Blocks & Blades 52"x¾" cap. 1500 lb.
Shear, B-36 Stanley Unishear, cap. ½", m. d.
Shear, O-36 Stanley Unishear, cap. 14 ga., m. d.
Shear, throatless, 10 ga. Marshalltown, m.d.
Tapping machine, ½" Pratt & Whitney, b. d.
Testing machine, 1000 lb. Olsen hyd., hand.
Tiering machines, 1000 lb. Economy hand power,
Transmission, Reeves No. 60-E. (new)
Turbines, 100 h. p. Westinghouse, 900 rev.
Turret lathe, 2" P. & J., thread att. chuck, b.d.(2)
Turret lathe, 18"x6' Springfield, Fox Monitor.
Turret-screw machine, 1"x15" P. & W.
Upsetter, 1½" Acme, all steel, for m. d.
Welder, arc, 160 amps, a. c., (near new) (2).
Welder, arc, 250 amp., a.c. Hampton (new).
Welder, spot, 5 KVA., Elsler, 6" arms.

# USED AND REBUILT MACHINERY

## FOR SALE BY

### The Shaler Company
**Waupun, - - - Wisconsin**

AUTOMATIC SCREW MACHINES.

12—Model 52 National Acmes, 3/4" capacity, 4 spdls, belt driven with motors, rebuilt and reconditioned in excellent condition. Real bargain.

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### Bleser Machinery Company
**209 N. Sixteenth St., - Springfield, Ill.**

Drill presses, 20" to 34".
Lathe, 21"x8' LeBlond, q.c., r.b., 32".
Planer, 24"x24"x4' Pond.
Shaper, 32" American.
Slotter, 12" Bement, 30" rot. table.

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### The State Machinery Co.
**865 Congress Ave., New Haven, Conn.**

IMMEDIATE DELIVERY

Broaching machine LaPointe.
Furnace, Blueing, 70A
Grinder, 84" diamond face, 30" diameter cup wheel, silent chain, 25 h.p. motor.
Polisher, wheel production 101.
Press, Bliss No. 301 cut & carry.
Lathe, gap, 40" South Bend.
Lathe, turret, 6A Potter & Johnson.
Screw machs, 52 Acme, 4 spdl. ser. No. over 12,000,(2).
Screw machines, 2½ sgle. spdle. Gridley, d.c. variable. speed motor drive, (2).
Screw machines, 4½ single spindle Gridley, d.c. variable speed motor drive. (3).
Screw machine, 1½, 4 spindle Gridley, model F.
Screw machine, 2½, 4 spindle Gridley, Model F.
Two hundred other machines in stock.

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### Jones Machine Tool Company
**Front & Pike Sts., Cincinnati, Ohio**

LATHES.

16"x6' Prentiss geared head, motor drive.
18"x10' Hendey tie bar, q. c.
16"x8' Lodge & Shipley, q. c. bowl head.
20"x12' Walcott, q. c., 3 step cone.
20"x8' Lodge & Shipley geared head.
20"x10' Sidney q. c. bowl head, belt drive.
24"x16' S. Boye loose change.
30"x16' American belt drive, (standard change).
36"x14' Boye & Emmes, belt drive, std. chge.

BORING MILL.

42" Niles single pulley geared feeds, 2 heads.

SHAPERS.

16" Gould & Eberhardt back geared crank.
20" Rockford back geared crank.
24" American b. g. crank.

GRINDERS.

No. 1 LeBlond universal tool and cutter grinder.
No. 60 Heald cylinder with fixture.

RADIAL DRILLS.

3' American triple purpose, s. p.
4" Mueller radial, s. p.
5' Foodick, single pulley.
8' Bickford, single pulley.

MILLING MACHINES.

No. 2A Milwaukee single pulley drive.
No. 3½ Fox cone drive.
No. 4 Hendey.

MISCELLANEOUS.

Punch presses, bolt and pipe threading machines Cleveland s. s. automatics, hack saws, upright drill presses, keyseaters, etc.

## FOR SALE BY

### Rosenkranz, Weisbecker & Company, Inc.
**2308 Singer Building, New York, N. Y.**

Boring mills, 60" Betts vertical, motor drive.
Gear cutter, 110" Newton, motor drive.
Grinder, Cincinnati 24", face mill, motor drive.
Keyseater, No. 20 Catlin, m. d.
Millers, 2 Ingersoll hor. facing mills, 9" spdls., m. d.
Miller, P. & H., vertical openside, keyseat, m. d.
Planer, 54"x54"x10' Rockford, 4 hds., m.d.
Planer, 36"x36"x12' Chandler, heavy duty, m.d.
Shear, angle, 8x8x1 Cleveland, turntable, m.d.
Slotter, 24" Dill, motor drive.

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### E. L. Klauber Machinery Co.
**3221 Olive St. - - St. Louis, Mo.**

Band saws, Metal, 14" Racine; 30" Klemm; m.d.
Gear hobber, No. 000 Schuchart & Schutte.
Hardness tester, Rockwell No. 5H-40.
Lathes, Cataract 2 machine unit. 1" & 2" with standard and screw machine attachment
Lathe, 14"x6' Reed-Prentice, q.c.g., taper attach.
Millers, hand, U. S. and Burke No. 3.
Presses, No. 4 R & K o.b.i., No. 69N Bliss, dbl. action.
Shapers, 16"-20" Ohio; 14" Hendey.
Threading machines, Landis S. H., 1½" and 2"
Turret Lathes, No. 1&2 Wood tilted; No. 2 sp. Garvin.

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### Reliance Machinery Sales Company
**1407 Brighton Place, N. S. Pittsburgh, Pa.**

Air compressors, 139 and 450 cu. ft.
Borer, car wheel, for 42" wheels.
Grinder, Bath 12x32" univ.
Hammer, 300 lb. Bradley, upright helve.
Hammers, 50 lb. Mayer upright, m. d.
Lathe, 27"x18' Reed-Prentice, arr. m.d.
Miller, 30"x10' Newton planer type.
Miller, No. 7-H Becker Lincoln type.
Press, No. 21½ Bliss, blanking, m. d.
Press, horning, No. 40 Bliss.
Press, No. 82-C Toledo dbl. crank, 5" shaft, 44" wide.
Press, No. 94-A Toledo dbl. crank, 6" shaft, 6" stroke, 40" wide.
Press, horning, No. 39 Bliss.
Press, toggle drawing, No. 3½-A Bliss.
Roller leveller, 84", 17—4½" rolls, m. d.
Slotter, 15" Bement, crank, 36" rot. table.
Turret lathe, No. 9 B. & O., 3" hole.
What do you need? What have you for sale?

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### Russell Machine Co.
**438 Oliver Bldg. Pittsburgh, Pa.**

Boring machine, Barrett 5" dia. bar cylinder.
Boring mill, 52" Bausch, geared feeds, d.c. m.d.
Boring mill, horiz., 6½" bar, Niles, floor type.
Boring mill, 10' Niles vertical.
Gear cutter, 36" Brown & Sharpe.
Hammer, 300 lb. Bradley, upright strap.
Hammer, 1500 lb. Bliss board drop.
Hammer, No. 2500 dbl. frame Chambersburg steam.
48" Morton Keyway cutter, cap. 3½" wide.
Lathe, 42"x17'6" Pond, p.c.g., triple grd., b.d.
Miller, 24" Cincinnati semi-automatic.
Pipe cutting & threading machine, 6" Landis.
Press, hyd. wheel, 300 ton Chambersburg, m.d.
Shear, Alligator, No. 61 Carlin high knife, 2½" sq.
Shear, 10'x¾" United power squaring, m.d.
Straightener, No. 1 Shuster flat strip metal, m. d.
Straightener, No. 1 Kane & Roach, cap. ¾" rd.
Upsetting machines, 2½, 3½, 4 and 5" Ajax iron bed.

# USED AND REBUILT MACHINERY

## FOR SALE BY

### Meisel-Swartz
### 1501 Washington Avenue
### Huntington, W. Va.

Bolt machine, National 2" c.s., b. d.
Cars, steel dump, A.C.F., 8 yd. 36" gauge, (5).
Drills, radial 7' Baush, 7'6" hoist, 4 speed.
Drills, upright, 30" Canedy-Otto, p. f.
Drills, upright, 20" Bickford, b. l.
Generator sets, engine, Harrisburg 100 K.W., d.c.
Generator sets, engine, Skinner Unaflow 150 K. W. d.c.
Generator sets, engine, Skinner Unaflow 300 K.W. d.c.
Grinder, No. 6 Safety Wheel Co., 52" double, m.d.
Hammers, steam, Niles 500 lbs., all tools.
Hoists, Yale 2 ton geared chain.
Lathe, 14"x8'6" Globe, plain gear.
Lathes, 15x8 Sebastian, b. g., q. c., m.d., milling att, tools.
Lathe, 27"x16' Bridgeford, plain gear, t.a.
Lathe, 28"x12'6" American, plain g.
Lathe, 30"x12' Schumaker & Boye, plain g.
Lockers, steel, 200 assorted sizes.
Locomotive, gasoline, Whitcomb 8 ton, 36" gauge (2).
Pumps, turbo, Moore 2800 g.p.m. condensing.
Saw, metal No. 3 Cochrane-Blye 20", b. d.
Scales, platform, 10 and 12 ton, Howe & Standard.
Shaper, Cincinnati 24" d.b.g., crank, b.d.
Woodworking machines, 450 - all types available.

## FOR SALE BY

### The Reeve-Fritts Company
### 28 N. Clinton St., Chicago

Boring machine, No. 1 Barrett, cylinder.
Drill, No. 3 Barnes horizontal, double head.
Grinder, No. 2 Grand Rapids tools & cutter.
Grinder, Gisholt universal tool.
Lathe, 27" x10' Fifield.
Miller, No. 1 Cincinnati universal.
Screw driver, No. 2 Reynolds, auto. feed.
Screw machine, 3" Cleveland automatic "A".
Tapper, No. 1 Garvin vertical, ¾".
Turret lathe, 19" P. & W., geared head.

### The Morton Machinery Co.
### 12327 Edwin Ct., Cleveland Ohio

Drill, Mueller radial, s.p.d., excellent cond.,.... $1,250.
Grinder, Thompson 12"x36" univ. with attachments. A good tool..... 1,200.
Lathe, 24" x8' Amer., q.c g., m.d., 100 ⅝rebuilt,. 2,200.
Lathe, 32"x12' Bay State, q.c.g., with countershaft dr., (like new)..... 1,700.
Milling machines, No. 13B Brown & Sharpe, A-1 condition, (2)..... $2,500. each.
Lift truck, 1 ton Clark, gas, tractor, recond..... 850.

## West Penn Machinery Company

Air compressors, 30 to 2500 cubic feet.
Air compr. portable gas I-R 100 cu. ft.
Blower, No. 4 Roots, capacity 2116 c. f. m.
Bolt cutter, 1" Landis, double head, b. d.
Bolt cutters, 1½" & 2" Acme, b. d.
Boring mill, 42" Bullard, 2 heads.
Boring mill, 72" Niles, 2 heads, b. d.
Boring mill, 10' Niles, 2 heads, b. d.
Bulldozers, Nos. 2, 4, 6, 9, 28, & 30.
Brake, 10'—14 ga., D. & K., hand.
Brake, press, 10'x5/16" Ohl, b.d.
Crusher, jaw, No. 4 Champion, b. d.
Die sinker, No. 2 Pratt & Whitney, b. d.
Drill sharpener, Ing.-Rand "Leyner", 1¼".
Drill, radial, 2' and 3' Simplex, m. d.
Drill, radial 6' Reed-Prentice, single pulley drive.
Drills, upright 10" to 36".
Engine, gas, 20 horse power Bessemer.
Flanger, McCabe, ¾" capacity, dies.
Gear cutters, 11", 18" & 24" Gleason.
Gear tester, bevel 18" Gleason.
Grinder, drill, No. 31 Oliver. 1½", m. d., 220/3/60.
Grinder, internal, No. 60 Heald, b.d.
Grinder, knife 10' Bridgeport, m.d.
Grinder, roll, Farrel 30"x76".
Grinder, surface, No. 1 Diam. 14x24, mag. chuck, m. d.
Grinders, D. E. 2—3 & 5 h. p., 220/3/60.
Grinder, disc, No. 8—30" Besly, belt drive.
Hammers, 50 lb., 75 lb., 100 lb., 200 lb. Upright.
Hammers, Nos. 2-B, 3-B, 4 B, 6-B, Nazel.
Hammers, steam, forging & drop.
Keyseater, No. 0 & No. 2 Mitts & Merrill, b. d.
Lathe, bench, 11"x4' South Bend, m. d.
Lathes, speed, 11" and 13" Blount, m. d.
Lathe, brass 18x6", friction head, power feed, b. d.
Lathe, 14"x6' American, t. a., b. d.
Lathe, 20"x10' Springfield, t. a., m.d.
Lathe, 28"x10' Chard, t. a., q. c. g., d. b. g., b. d.
Lathe, 42"x16' Schumacher Boye, q. c. g., belt drive.
Lathe, Lo-Swing, 6"x60", s. p. d.
Lathe, roll, 42"x20' United, m.d.
Lathes, turret, Nos. 1, 2 and 3 W. & S., b. d.
Lathe, wheel, 78"x84" Bement, motor drive.
Locomotive, gas, 8 ton Milwaukee, 36".
Locomotive, steam, 50 ton Baldwin, std. ga,
Miller, plain, No. 0 Steptoe, table 30x9, b. d.

## 1210 House Building, Pittsburgh, Pa.

Miller, universal, No. 4 Garvin, b. d.
Miller, vertical, Burke, table, 16x6, b. d.
Mixers, Sprout-Waldron, batch & liquid.
Nibbler, No. 1 Campbell 3/16", 6" gap, m. d.
Pipe mchs., 2", 4", 6", 8" & 12" Landis-Oster-Williams.
Planer, 39"x33"x12" Cincinnati, 2 hds., b.d.
Press, forging, 150 ton United, steam hyd.
Presses, OBI, No. 19 Bliss & No. 4 Niagara, 2" str
Press, No. 55 Toledo, bed 20x19.
Press, screw, No. 87 Niagara, hand power.
Press, arch, No. 30 Bliss, roll feed, b.d.
Pumps, centrifugal 6", 4", 1", motor drive.
Punch, EF Cleveland, 36" throat, 1½" thru 1".
Punch, multiple, 32 K W & W, 10' 2"
Punch, horiz. No. 7 Kling, m. d., 220/3/60.
Riveters, air, hammer, spinning.
Rolling mill, cold 9"x18" motor drive.
Saws, friction, Nos. 2, 3 & 4 Ryerson motor drive.
Saw, cold, 48" Newton motor drive.
Shapers, 16", 20", 24" & 36" Gould & Eberhardt.
Shears, alligator, 1½", 2", 3", 4" & 6".
Shear, Angle 6x6x1 Long & Allstatter, m. d.
Shear, Niagara 42"x14 ga., belt drive.
Shear, Niagara 42"x10 ga., belt drive.
Shear, No. 162 Niagara, 62"x18 ga., b. d.
Shear, Stoll 60"x3/16", motor drive.
Shear, 8'x14 ga. Ohl, m. d., 15/220/1/60.
Shear, 10', 18 ga. Niagara, b. d.
Shear, plate, 45"x¾" Ironton, 24" gap, m. d.
Shear, circle No. 3 Bliss, 40"x20 gauge.
Shear, guill, No. 2 H. & J., 2½" rd. b. d.
Shear, 10'x¼" Bliss, holddown, b. d.
Slitter, gang, 36" Yoder motor drive.
Slitter, gang, 36" Braddock, belt drive.
Slotters, 6" & 24" Newton.
Straightener, 12"x¾" Shuster, b. d.
Straightener, 12"x¼" Shuster, b. d.
Straightener, AS & TP 12"x3/16", belt drive.
Straightener, 48" Aetna-Standard, 17 roll 1¾", m. d.
Straightener, 60" McKay, 17 rolls 4½", m. d.
Straightener, 84" McKay, 17 rolls 5¾", m. d.
Testing machine, 400,000 lb. Riehle, b. d.
Thread rollers, W-F No. 20—1".
Tumbling barrel, 34"x45", belt drive.
Upsetters, 1" to 6".
Welder, spot, 13 K. V. A.

**PRICED RIGHT FOR QUICK SALE**

Boring Bar 3" Beaman & Smith Horizontal, Floor type

Milling Machine, No. 4 Cincinnati

Metal Band Saw, Houston & Richardson, 9x10, motor driven

Face Grdr., 14" Dia., 9x26" workg. sur., b.d.

Keyseater, No. 2 Mitts & Merrill, 2½" dia. post, cap. 12x1-¼"

Broaching Mach.. No. 3 LaPointe-Hudson, cut keyways to 1-⅝"

Pipe Threader, Cox & Son 2-8" cap., for motor drive, but no motor.

Mills, Becker Lincoln type, overarm dia. 3-⅛", 9x29½" table

Boring Mill, 30" Rogers vertical, swing 35½", all geared feeds

Drill Press, Allen 4-spindle, 8" overhang, 11" between spindles.

**GLOBE MACHINERY COMPANY**
**602 W. Lake St. Chicago, Ill.**

**FOR SALE**

We have just purchased and offer for sale all of the equipment and supplies of the Bruce Dry Dock, Pensacola, Fla. Our representative is at the plant. Your inspection and inquiries invited. Outstanding items in this plant are Bolt Machines, Drill Presses, Hack Saws, Steam Hammer, Hoists, Keyseater, Lathes, Motors, Planers, Punches & Shears, Bending Rolls, Flanging Clamp, Milling Machine, Shaper, and the following Ingersoll Rand Compressor: 25"x15—¾"x18" horizontal, duplex, 2 stage motor driven Air Compressor, complete in first class condition.

**DIXIE MILL SUPPLY CO., INC.**
**901 Tchoupitoulas St., New Orleans, La.**

**FOR SALE BY**

**Machine Tools Sales Company**
**513 No. 17th St., - Philadelphia, Pa.**
**Cable Address: MACHTOOL, PHILA.**

Bolt cutter, 3" Landis, geared, m. d.
Boring mill, 10' Betts vertical, m. d.
Boring mill, 90"—12' Betts vertical.
Borer, No. 3—6" bar, Barrett, horiz. cylinder.
Drill, radial, 8' Sellers m. d.
Grinder, 10"x36" Landis plain self-contained.
Hammer, 300-ton United Eng. st. forging.
Lathe, 26"x14' Bridgeford plain turning.
Lathe, 20"x8' Prentice, geared head.
Miller, thread, 11"x24' Milled Screw Co.
Miller, thread, No. 37 Smalley gen., 18" pot chuck, 39" deep, 10" hollow spindle.
Miller, thread, No. 23 Smalley gen., 6" spindle, (2).
Planer, 22' No. 2 Hilles & Jones, plate.
Planer, 22' Southwark plate.
Planing machine, 72" Newton vertical, m. d.
Roll, 10'x8" Teal pyramid, drop end.
Slotter, 18" Bement crank, m. d.
Slotter, 12" Hewes & Phillips.
Slotter, 9" Sellers.
Strip mill, 16"x24" Bliss revers. 2-hi., cold, 350 h. p., 440 v., a. c. motor.
Truck, 6,000 lb. auto. trans., 72" Tier lift.
Truck, 6,000 lb. Lakewood Eng., 60" Tier lift.
Trucks, 6,000 lb. Baker, 60" Tier lift, (2).
Turret lathe, 24" Steinle, 6¼" spindle.

**WANTED**
**TAPS-TWIST DRILLS-FILES**
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Lathes, Milling Machines, Shapers, Boring Mills, Slab Millers, Drills, Punch Presses, Squaring Shears, Wire Forming & Cutting Machines, Bolt, Nut and Rivet Machinery.

*At Reasonable Prices*

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**FOR SALE — GOOD TOOLS**

**Automatic,** No. 0 B. & S...**No. 2920 $1450.**
**Drill,** 2 Spd. Cleveland H.S., B. B., No. 2 MT Tapping Att., on each.....**$300.**
**Drill,** 2 spd. Allen H. S. B. B. 14" Swing, No. 2 M. T. .....**$300.**
**Gear Hobber,** No. 5A Lees Bradner, Cap. 14"x4 D. P. .....**$600.**
**Gear Cutter,** No. 6 B. & S., Cap. 60"x11" .....**$3500.**
**Grinder,** 18"x50" Sterling, Motor Driven, Rebuilt .....**$3500.**
**Grinder,** American, Drill, cap. ⅛ to 2¼" with pump .....**$75.**
**Lathe,** 15"x6' LeBlond, Q. C., M. D., Taper .....**$800.**
**Lathe,** 16"x6' Johnson, Q.C. Belt Drive.**$500.**
**Lathe,** No. 4 Stark. Bench, ¾" .....**$150**
**Lathe,** Amer., Bench, ½" with Motor & Bench .....**$200.**
**Threader,** Namco, 2-sp., ⅝" Cap.....**$200.**
**Miller,** No. 2, Craftsman Rotary .....**$750**
**Miller,** No. 2 P. & W., Power Feed, 5x24 Table .....**$250.**
**Miller,** No. 25 Becker, Power Feed, 8x27 Table, Vert., Hd. .....**$500.**
**Scraper,** Anderson, Motor Drive.....**$500.**
**Shaper,** 21" Averbeck, B. G. Crank, Belt Drive .....**$600.**
**Tapper,** ¼" Hart-Hageman, Auto.....**$250.**
**Flame Cut.,** Hancock 01, 18x18, Gas..**$200.**

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# Modern Machines * * Immediate Delivery!! Complete Plant.

**We have just secured a complete plant, and offer for immediate delivery the machinery listed below. All items may be inspected on their original foundations, and we suggest your prompt inspection of the machines of interest to you.**

***OUR REPRESENTATIVE WILL BE AT THE PLANT.***

**60″x30′ Niles-Bement-Pond Geared Head Lathe, motor drive.**

**60″x28′ Niles-Bement-Pond Geared Head Lathe, motor drive.**

**60″x26′ Niles-Bement-Pond Geared Head Lathe, motor drive.**

**36″x22′ LeBlond Geared Head Lathe, motor drive, internal Geared Face Plate Drive.**

**27″x18′ LeBlond Geared Head Lathe, motor drive.**

**25″x18′ LeBlond Geared Head Lathe, motor drive.**

**No. 5 G LeBlond Heavy Duty Universal Milling Machine, motor drive, complete with dividing heads.**

**72″x48″x12′ Dietrich & Harvey Openside Planer, box table, two heads on rail, one side head. Complete with D.C. motors and controls.**

**60″x60″x12′ Niles-Bement-Pond Planer, box table, with two heads on rail, one side head; belt drive.**

**32″ Gould & Eberhardt Shaper, motor drive through gear box, has swivel table.**

**6′ Niles-Bement-Pond Full Universal Radial Drill, motor drive through gear box on base, has box table.**

**10″x1″ Niles-Bement-Pond Bending Rolls, drop end housing, belt drive.**

**Also six 24″ and 28″ Shapers, cone drive, Gould & Eberhardt and Cincinnati makes, and two LeBlond cone drive lathes.**

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**AIR COMPRESSORS.**
245 cu. ft. 10"x10" Inger.-Rand Class ER1, M.D.
368 cu. ft. 12"x10" Inger.-Rand Class ER1, M.D.
538 cu. ft. 14"x12" Inger.-Rand Type ER1, M.D.
2090 cu. ft. 15/30x27/16½x24 Worthington Engine Driven. 90 lbs. Pressure

**BALER**
Logeman Scrap Baler Model 20-P. Box 26"x12"x 11". Bale 11"x4"x4"

**BENDING ROLLS**
10' Bertsch Initial Type Plate Bending Roll capacity 1¼" Plate. Drop End housing, motor driven—Including D. C. Motor
12' Niles Pyramid Type, M.D. Capacity 1"
20' Covington Initial Type, M.D. Capacity 1" Plate

**BORING MILL—HORIZONTAL**
10' Niles Cylinder Boring Machine, M.D. 30" Dia-Bar, will bore and face 16" cylinder

**BORING MILLS—VERTICAL**
72" Gisholt, Motor Driven
90" Pond, Motor Driven

**BRAKE—LEAF TYPE**
6' Dreis & Krump "Chicago" No. 167, Motor Driven. Capacity ¾"

**BRAKES—PRESS TYPE**
12' Ohl, B.M.D. Capacity ¾" Plate
8'6" Loy & Nawrath, M.D. Capacity No. 10 Ga.
10' Geo. A. Ohl, M.D. Capacity No. 10 Ga.

**BULLDOZERS**
No. 7 Ajax Motor Driven. Face of Crosshead 12"x 76". Stroke 16"
No. 7 Williams & White, Motor Driven. Face of Crosshead 16"x70". Stroke 22"
No. 29U Williams & White, Arr. for M.D. Face of Crosshead 36"x20"x10". Stroke 28"

**CRANES—OVERHEAD ELECTRIC TRAVELING**

| | | | |
|---|---|---|---|
| 5 ton | P & H | 33'6" | Span 220 Volt D.C. |
| 5 ton | Bedford | 35'6" | Span 220/3/60A.C. |
| 5 ton | P & H | 37'0" | Span 220 Volt D.C. |
| 5 ton | Niles | 48'3" | Span 220 Volt D.C. |
| 5 ton | Shaw | 47' | Span 220/3/60A.C. |
| 5 ton | Shepard | 77' | Span 220 Volt D.C. |
| 5 ton | Whiting | 91' | Span 220 Volt D.C. |
| 5 ton | Northern | 100' | Span 220 Volt D.C. |
| 10 ton | Whiting | 27'4½" | Span 440/3/60A.C. |
| 10 ton | Niles | 50' | Span 220 Volt D.C. |
| 15 ton | Toledo | 27'6" | Span 440/3/60A.C. |
| 20 ton | Northern | 65' | Span 220 Volt D.C. |
| 25 ton | Niles | 30' | Span 220 Volt D.C. |
| 25 ton | Cleveland | 75' | Span 220 Volt D.C. |
| 35 ton | P & H | 38'4" | Span 220 Volt D.C. |

**DIE CUTTING MACHINE**
Type BL 2416 Keller Automatic Die Cutting Machine complete with electrical equipment, actual service about 1 year

**DIEING MACHINE**
25 ton Henry & Wright

**FLAME SHAPE CUTTING MACHINE**
Gas-O-Machine Products Co. Flame Cutting Machine for cutting odd shapes from steel up to 6" thick 50"x12" long

**FORGING MACHINES**
¾" to 7" Ajax, National, Acme, Steel Frame

**FURNACES**
3 ton Pittsburgh Electric Steel Melting Furnace. Complete with Transformers
9000 lb. Swindell Electric Melting Furnace. Complete with 1800 KVA 22,000/3/60 Transform.
10 T. No. 5 Heroult Slag Melting Furnace. Complete with 7500 KVA 11,000/3/60 Transformers (New)

**GEAR REDUCTION UNITS**
500 HP Falk Double Reduction Gear Drive 18.6 to 1 Gear Ratio, 646 to 35 RPM
700 HP United Engr. & Fdy. Co., Gear Reduction
1500 HP Mesta Gear Reduction 9.75 to 1 Gear Ratio. Complete with 1500 HP General Electric Motor 4600 Volt, 3 Phase, 60 Cycle, 300 RP
1500 HP Falk Gear Reduction. High Speed Shaft 234 RPM. Low Speed Shaft 26 RPM. Complete with 1500 HP Allis Chalmers Motor 2200 Volt, 3 Phase, 60 Cycle

**GENERATOR SETS**
500 KW General Electric Generator with 665 H.P. McIntosh Seymour Diesel Engine
4000 KW General Electric Steam Turbo Generator 4500/3/60 with Direct Connected General Electric Steam Turbine

**HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING**
800—8000 lb. Chambersburg, Billings & Spencer, Erie, Niles-Bement-Pond

**HAMMERS—NAZEL**
No. 3B Nazel Hammer M.D. Capacity 4" Square
No. 6B Nazel Hammer M.D. Capacity 7" Square

**KEYSEATER**
No. 8 Mitts & Merrill Giant Keyseater M.D. Capacity 4" down to ¾"

**LATHE—ROLL**
48"x21'6" Standard Engr. Co. Roll Lathe, B.D. Handles rolls 30"x10'

**LEVELLER**
60"x144" Hyde Park Hydraulic Stretcher Leveller. Complete with Motor and Pump

**MOTORS**
400 HP General Electric, 220/3/60, 514 RPM
500 HP General Electric, 220/3/60, 1200 RPM
1000 HP Crocker-Wheeler Mill Type Motor, 2200/3/60, 300 RPM
1500 HP General Electric Mill Type Motor, 4600/3/60, 300 RPM

**PLANER—OPEN SIDE**
60"48"x38' Liberty Three Head, Motor Driven

**PLANER—PLATE EDGE**
16' Southwark, Arr. for M.D. Equipped with Pneumatic Jacks. Capacity 1" Plate

**PRESSES—HYDRAULIC**
300 ton Chambersburg Self-Contained Four Column Hydro-Pneumatic Press. 12" dia. of ram, 18" stroke, 49" Between Columns
500 ton United Engineering and Foundry Company. High Speed Hydraulic Forging Press, Four Column Type
760 ton Southwark Vertical Press, 20" Stroke, 41½"x19" Between Columns

**PRESSES-STRAIGHTWISE-SINGLE ACTING**
No. 205H Toledo Overhanging Gap Type Press, 17"x6' Bed Area, 4" Stroke
No. 166½ Cons. 47"x52" Bed Area, 6" Stroke

**PRESSES—DOUBLE ACTING—TOGGLE**
250 ton Birdsboro, Tie Rod Construction, 18" Stroke of Blankholder, 36" Stroke of Slide, 42"x42" Area Blankholder. Equipped with Marquette Hydr. Cushions
No. 4 Bliss, Tie Rod Construction. 10" Stroke of Blankholder, 14" Stroke of Slide, 34"x31½" Area Top of Bed

**Entire Surplus Manufacturing Equipment Inventories Purchased.**

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**PRESSES—MISCELLANEOUS**
300 ton Southwark Hydraulic Shell Piercing Four Column Press. 41"x65" Between Columns, 48" Dia. Ram, 48" Stroke
No. 6 Bliss Horizontal Reducing Press. Belt Drive, 8" Stroke
D-45 Ferracute Press. Horizontal double end, Screw type, 36" ram stroke

**PUNCHES—BEAM**
Kling Beam Punch & Coping Machine. Arr. for Motor Drive. Capacity to cope or notch 6" to 24" I-beams. Equipped to punch six ¾" holes in ½" plate
Williams & White No. 12P Arr. for M.D. Throat 25". Capacity Angles 8"x8"x1". Complete with Spacing Table 30' long each end of machine

**PUNCHES—MULTIPLE**
No. 4 Hilles & Jones, Arr. for M.D. Capacity 48 1" holes thru ¾" or 475 tons ram pressure
No. 7 Hilles & Jones Automatic Gag Drum Control. Cap. 40 13/16" holes thru ⅝" Plate. Eq. Thomas Spacing Table
No. 32 Williams & White with Thomas Spacing Table, M.D. Will handle 8' wide plate up to 30' long

**PUNCHES & SHEAR COMBINATIONS**
No. 4 Hilles & Jones Double End, M.D. 48" Throat. Capacity Punch 1½" through. Each end of machine equipped with Lysholm Table
No. 6 Beatty Double End, M.D. 16" Throat. Capacity Punch 1" through 1"
Hilles & Jones Punch, Sle. End. M.D. Thr. 60" Cap. Punch 2" through 1¼" with Lysholm Table
Type G Cleveland Single End, Arr. for M.D. 12" Throat. Capacity Punch 2" through 1"
Lysholm Double End, M.D. 44" Throats. Capacity 1¼" through ¾". All steel

**ROLLS—ANGLE BENDING**
4"x4"x½" Bertsch Initial Type, Drop End Housing, Motor Driven

**ROLL—CORRUGATING CURVING**
10" Bertsch Initial Type, Belt Drive. Capacity 3/16". 2.66 Corrugations

**ROLLS—PLATE STRAIGHTENING**
96" Newbold, Arr. for M.D. Nine 14" Dia. Rolls. Capacity 1½" Plate

**ROLL—TAPER FORGING**
No. 1 Ajax. Belt Driven

**ROLLING MILLS**
10"x12" UE&F Co. Single Stand Two High
10"x16" UE&F Co. Single Stand Two High
12"x15" Mackintosh Single Stand Two High
12"x20" Philadelphia Single Stand Two High
12"x36" Lewis Single Stand Two High
14"x42" Garrison Lead Mill, Single Stand 2 High
16"x19" Waterbury Farrel Four Stand Two High
16"x20" Waterbury Farrel Single Stand Two High
34"x76" Farrell F. & M. Co. Two Stand 2 High
9" Belgian Type Bar Mill, 2 Stands 3 High
2 Stands 2 High
16" Garrison Bar Mill, 2 Stands 3 High
1 Stand 2 High
19" Morgan Bar & Shelp Mill, Eight Stand
24" Mackintosh Bar Mill, 2 Stands 3 High
15"x46 Aetna St. Engr. Co. Tube Mill Single Stand Two High
23" Cold Roll Tin Plate Sheet Mill
24" Cold Roll Tin Plate Sheet Mill
30" Morgan Billet Mill Three High

**SAWS**
No. 0 Ryerson Friction Saw, M.D. Capacity 8" I-beams, 3" Square, 1" Round, 4"x4"x½" Angles, 8" Channels, 3½" Pipe
48" Ryerson Friction Saw Motor Driven. Hydraulic Feed

**SHEARS—ANGLE**
Long & Allstatter Double Angle Shear, Arr. for M.D. Capacity 4"x4"x½"
Hilles & Jones No. 2 Double Angle Shear, Arr. for M.D. Cap. 6"x6"x1"

**SHEARS—BAR**
Mesta Guillotin Type Steel Frame, Arr. for M.D. Capacity 6" Square, 26" Between Uprights

**SHEARS—GATE**
84" Hilles & Jones No. 6 B.D. Capacity ¼" Plate
96" Hilles & Jones No. 6, Arr. for M.D. Capacity ½" Plate
132" Morgan Gate Shear,, 7½" Stroke. Capacity 1¼" Plate
144" Hilles & Jones No. 7, Arr. for M.D. Capacity 1" Plate

**SHEARS—HYDRAULIC**
350 ton Morgan Three Cylinder Up Cut Hydraulic Shear. Capacity 10"x10" hot steel
900 ton Steam Hydraulic Shear. Complete with Intensifier & Gauge for cutting slabs 12" min. to 16' max. Stroke 32"x8"

**SHEARS—ROTARY**
Newbold Double Rotary Shear. Knife Dia. 15". Max. Cut 100" Wide, Min. 8"
No. 40A Quickwork Rotary Shear, Arr. for Motor drive. Capacity ½" Plate. Complete with Circle Cutting Attachment

**SHEAR—ROTARY FILING**
United Engineering & Foundry Co., motor driven. 1" rounds up to 2"x3" flats

**SHEARS—SQUARING**
60" Hilles & Jones No. 2, Belt Drive. Capacity ¼" Plate
96" Wais & Roos, Arr. for M.D. Cap. ¼"

**SPACING TABLE**
Beatty Quick Acting Spacing Table. Arranged to handle Angles in Single Pairs or Double Pairs. Max. depth I-beam for flange punching 24" Max. Size I-beam for Web punching 30". Will handle material 50' long

**SPRING COILING MACHINE**
No. 1 Sleeper & Hartley Universal Model No. 666-48". Capacity .015" to .080" inclusive

**STRAIGHTENERS**
No. 0 Medart, Arr. for M.D. Timken Equipped. Capacity ¼" to 1½" dia. bars any length
2" Haldeen No. 2 Straightening & Cut-off Machine. Arr. for M.D. 12' Cut-off
⅜", 3/16", ¼", ½" Shuster Rotary Straightening Cut-off Machines
United Engineering & Fdry. Co. Straighteners of Gas Press M.D. Capacity 1¼" to 5" tubing

**TESTING MACHINES**
40000 lb. Riehle Bros. Universal
100,000 lb. Olsen Universal, Motor Driven

**WIRE DRAWING MACHINES**
No. 12-22 Vaughn Motobloc, Arr. for M.D. Block 30" Dia. Will draw stock up to 1 1/16" dia. or finished wire 1" dia.
Model 1-7 Waterbury Farrel Tandem Wire Drawing Machine, M.D. Capacity ½" or 5/16" down to .081 & .091 to .162 Wire. Complete with coiler and spooling equipment

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**ARC WELDER**—G. E. 200 amp., m.d.

**BORING MILLS**—Niles 36" c. d. Baush 44" m.d. Bullard 51" Vert., 2 hds., Bullard 42" Mill, vert.; Rockf. No. 2 horiz., 3⅛" Bar; Colburn 42" Vert. 2 Hds.

**BRAKES**—D. & K., 5' Box & Pan, 14 ga. Keene 10' 16 ga. Toggle Press.

**DRILLS (RADIAL)**—Mueller 2½', Fosdick 2½', Fosdick 4', Carlton 4' all gear box dr.; Hammond 4' sensitive; Mueller 4½' g. box; Bickford 4' Gr. Box.

**DRILLS (H. S. B. B.)**—H & W 2, 4, 5sp.; Allen 2 & 6-sp.; Avey, Demco, Lel-Giff. 1-sp.; Sipp 2 & 3-S.P.; Avey 2-sp.; Aveymatic 2-sp., m.d.

**DRILLS (MISC.)**—Baker No. 217 (2) Hvy. Duty; Hamilton 42" S. H.; Barnes 20" & 24" 1-sp. & 20" 4-sp. & 24" 3-sp. all grd. camel back; P & W No. 12 Multi-Sp.; Natco 20 sp. Rect. head; P. & W. 24 sp. Adj.

**GEAR CUTTERS**—G & E 60" & B & S 26" s. p. d. automatic spur; Cincinnati 36" gear cutter. G. & E. 48" gear Cutter.

**GRINDERS**—P & W 12" vert. surf.; Cin. No. 1½ & B & S No. 12 univ. tool, B &S Nos. 11&16 pl. Heald Nos.60&65 Int.; Landis 10x36" Plain; B & S 10x48"; 3—Norton 6x32" plain, Heald No. 20 Rotary Surface (3); Badger No. 220, auto. d. e., opposed disc (4); Norton 10" x 36"; Diamond No. 2 Auto. Surf.

**HAMMERS**—Mayer 50-lb.; W & W 165 lb.; Beaudry 400 lb.; High Speed Rivet No. 3-A Beaudry 150 lb.

**KEYSEATERS**—Mitts & Merrill No. 5 vert. Davis No. 1; M. & M. No. 0.

**LATHES**—Monarch 16"x10' M.D.; LeBlond 18x8'; Lehmann 18"x9'; Amer. 22x8'; Davis 22"x10'; L & S 20"x10'; S-B & E 20"x10' q. c. g; Flather 22"x10'; LeBlond 16"x8'; Gleason 45"x12"; Monarch 16" x 8' (2); Ryerson 20x10', m.d.; Mueller 22"x12', S.B.E. 30"x12' Q.C.G. Hendey 16"x8' C.H.; Hendey 16"x10' grd. hd.

**MILLING MACHINES**—Cin. No. 1½, Ohio No. 29, 3 & Brown & Sharpe No. 3 Universal; Ohio No. 20, American No. 1½, Cin. No. 3, Hendey No. 3, B & S No. 3, LeBlond No. 3H, LeBlond No. 4 M.D. C.D. & Cleveland No. 2 S.P.,D. Plain Cin. 24" Auto. Plain; Becker No. 6 and Model "B" Vertical; Owen Duplex; Ingersoll M.D. Slab Miller 4 hds.; Becker No. 5-B Vertical.

**PLANERS**—Gray 48" x 48" x 10'; Gray 28"x28"x6' 1-hd.; Pond 32"x34"x10'; Sellers 36x36x12'; Pease 26"x26x9'.

**PUNCH PRESSES**—Federal Nos. 1, 2, 3 o.b.i.; Bliss No. 18 & 19; Ferracute No. P-4; Fer. No. EGF 52 Coining; Willard No. 4A o.b.i.; Swaine No. 38 arch, Swaine No. 37 O.B.I.; Rockford Nos. 2 & 3; and Verson No. 4 O.B.I; Bliss No. 19½; Michigan No. 4 O.B.I; Niag. No. 4, Niag. No. 5, L & J No. 3, Bliss No. 407-A Double Action Toggle Drawing wt. 7000 lbs.; Bliss No. 68-N; Cons. No. 24 Blanking; Bliss No. 20, Bliss No. 21

**SAWS (HACK)**—Rac. 6x6" h.s.; Rac. 8x8; Peerless 6x6" H.S. (4); Atkins 8x8".

**SAWS (COLD)**—Cochrane & Bly Nos. 2-B & 4-B; Peerless 6x6 Univ. Shaping.

**SHAPERS**—S & M, G & E, Ohio, Mi., Q. City, Davis, Cin. 16"; Ohio & G & E 20"; S & M, Q. City, Rock, Cin. 24"; Ohio 26"; Cin. 24" s. p. gr. box; American 24" heavy, b.g. Amer. 15"; Springf. 15"; S.&M. 26", b.g. G. & E. 24", s.p., gearbox; Amer. 20"; Rhodes 7"

**SCREW MACHINES**—W.&S. Nos. 6, & 8 Hand; Nat. Acme. Nos. 515, 4-sp.; Gridley 4-sp. ⅞"; Automatic, Gridley 4 spindle, 2¼"; B.&S. No. 4 Hand; Nat. Acme No. 52; Gridley 4-sp. 9/16"

**SLOTTER**—Bement-Miles 10" vert.

**SQUARE SHEARS**—Ohl 10" 10 ga.; Bertsch 60" 16-ga. gap; Niag. 10' 14 ga.

**TAPPING MACHINES**—(2) Garvin No. 2 & 2X Vertical Automatic & Garvin No. 1.

**TURRET LATHES** — Bullard 36" vertical, rapid production. Bausch 30" M.D.; Bullard 24" vert. rap. prod.; W.&S. No. 8; Potter & Johnston, 8½x16 No. 10

***Above is only a small part of our large stock on hand***

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1531-35 N. Broadway ST. LOUIS, MO.

# REBUILT & GUARANTEED MACHINES

**BORING MILLS—horizontal:**
5" bar Niles, Knee type, Circ. Table
3" bar Lucas, Table type, & Aux.Tb.

**BORING MILLS—vertical:**
72" NBP, Heavy Duty, PRT., MD..
53" NBP, Heavy Duty, M.D.
42" NBP Standard, M.D.
42" Colburn Heavy Duty, M.D.
42" Bullard P.R.T., M.D.
36" Bullard Rap. Prod., Side H.
24" Bullard Rap. Prod., Side H.

**ENGINE LATHES:**
36"x24' Bridgeford H.D. M.D.
20"x14' Cisco, Geared Head
20"x14' Walcott, Geared Head
20"x10' LeBlond, Geared Head
20"x10' American, Geared Head
18"x 8' American, Geared Head
16"x14' Lodge & Shipley, M.D.
14"x10' Hendey, Geared Head
14"x 6' Prentice, Geared Head
10"x 5' P. & W. Prod. Lathes

**GEAR CUTTERS:**
60" Gould & Eberhart, M.D.
72" Gould & Eberhart, M.D.
No. 12 Barber-Colman Hobbers
No. 62 Fellows Gear Shapers
No. 6 Fellows Gear Hobber
24" Gleason Gear Planer

**MILLERS:**
No. 2A Brown & Sharpe, Universal
No. 2AU Garvin Universal
No. 2 Van Norman, Duplex
No. 4 Hendey, Plain
No. C Becker Vertical M.D.
No. 5 Brown & Sharpe, Vertical
No. 6 Becker Vertical
28" Cincinnati, Semi-Automatic
24" Cincinnati Duplex
18" Cincinnati, Duplex
60" Garvin Automatic Duplex
No. 3 P. & J. Automatic Vertical

**PLANERS:**
72"x72"x12' Putnam, Hvy. Duty, (2)
72" Morton Portable
42"x42"x12' Pond
47"x40'x12' Gray Heavy Duty
36"x36"x12' Bickett, Heavy Duty
30"x30"x12' Whitcomb, H. Duty

**RADIAL DRILLS:**
3'6" American Plain, MD, thru G.B.
6' Cincinn-Bickford, M. on Arm

**MISCELLANEOUS:**
24" Gould & Eberhart Shaper
16" Gould & Eberhart Shapers
No. 3 B. & O. Turret Lathe
8" Stoever Pipe Threader
No. 2 Lapointe Dbl. Spindle Broach
500 ton NBP dbl. Carwheel Press
2" Gridley type "G" 4 Spin. Aut.

**Special: 1000 ton Allsteel FORGING Press**

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5—"Ex-Cell-O", No. 31, Precision THREAD GRINDERS; complete electrical equipment, motors, etc. Grinding spindles, dial and feed screw; lead screw; nut assemblies; grinding wheels; etc.
2—"Ex-Cell-O", No. 33, Precision THREAD GRINDERS; complete electrical equipment, motors, etc. Grinding spindles, dial and feed screw; lead screw; nut assemblies; grinding wheels; etc.
3—"Ex-Cell O", No. 35, Precision THREAD GRINDERS; with complete electrical equipment; with grinding wheels; etc.
2—"Ex-Cell-O", Style 2112-A, Precision BORING MACHINES. Motor-driven with pump; carboloy tools, etc.
1—"Ex-Cell-O", No. 218, Precision BORING MACHINE; motor-driven, with carboloy tools, etc.
2—No. 39, "Van Norman" External Automatic RADIUS GRINDERS; motor-driven.
2—"Erco" 75-ton, Hydraulic STRETCHING PRESSES, Type HYSP-75

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1—No. 35, "Ex-Cell-O" Heavy Duty, Precision THREAD GRINDING MACHINE, swings 18-⅞-in. With complete electrical equipment, motor, etc. Also dials, feed screws, grinding wheels, dressing diamonds, etc.
1—No. 35, "Ex-Cell-O" Precision THREAD GRINDING MACHINE. With complete electrical equipment, motor, etc. With wheels, diamonds, etc.
3—"Lees-Bradner" Model 2-HS, GEAR GRINDING MACHINES, double wheel type; for spur and helical gears from 2-in. to 12-in. Complete Electrical equipment, with motor, etc. With racks, grinding wheels, etc.
2—Special No. 3-C, Collet Type, THREAD MILLING MACHINES; for milling either internal or external threads; complete with electrical equipment, motor, etc.
1—"Mattison" Precision, SURFACE GRINDER, 24-in. wide x 30-in. high x 96-in. Complete with electrical equipment, motor, etc.
1—"Barnes" No. 2610, HONING MACHINE; full hydraulic type; fluid motor-drive. Motor-driven with motor, etc.
1—"Erie" 15,000-lbs. Air Operated HAMMER, with 300,000-lbs. anvil.
1—"Erie" 20,000-lbs. Air Operated HAMMER, with 500,000-lbs. anvil.
1—"Erie" No. 24, Geared Tie Rod Frame, TRIMMING PRESS; motor-driven.

---

FOUR-SLIDE BENDING MACHINE, ⅝-in. cap'y. BAIRD.
PIPE MACHINE 10-in.—STEAM HAMMERS 1,100 and 800-lb.
UPSETTERS 1½ and 2-in.—GEAR CUTTER 36-in.—BOLT THREADER 2-in.—
Various sizes of RADIAL DRILLS—SHAPERS—SLOTTERS—GRINDERS—SAWS—
PLATE-SHOP MACHINERY, Punches, Shears, Bulldozers, etc. ALSO
SAND MIXERS—WOOD-WORKING MACHINERY—etc., etc.

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McCABE & SHEERAN MACHINERY CORPORATION

(REG. U. S. PATENT OFFICE)

**50 Church St., New York**

Mc CABE & SHEERAN MACHINERY CORPORATION

# Forward—

**We invite you to consider this list as typical of the remarkable lists of "USED" Tools that are to follow this year.**

**You will find here only the most desirable Machines of assured quality and reliability—and at prices more reasonable than you would possibly expect.**

**10** "POTTER & JOHNSTON" No. 5-A Automatics Single Pulley Drive.

**42** INCH SWING CAR WHEEL LATHE Double-head—Motor-driven "Niles-Bement-Pond".

**BIG** Vertical Boring Machines
- 18-24-ft. swing SELLERS Exten. type, 2 hds.
- 10-ft. swing NILES, 2 hds.
- Others—down to 30-in. Swing

**BIG** Horizontal Boring Machines
- 12 -in. bar NILES Cylinder Borer
- 6½ -in. bar NILES "Floor-type"
- 5 -in. bar BARRETT Cylinder Borer
- 8 -in. and 5-in. bars 2-spindle Locomotive Cylinder Borer

**BIG** Engine Lathes
- 60-in. swing, 34-ft. bed, PUTNAM, blocks to 80"
- 60-in. swing, 20-ft. bed, NEW HAVEN
- 50-in. swing, 35-ft. bed, BEMENT
- 48-in. swing, 18-ft. bed, AMERICAN
- 42-in. swing, 72-ft. bed, GUN BORING LATHE
- 42-in. swing, 30-ft. bed, JOHNSON, Taper att.
- 42-in. swing, 11-ft. bed, ARMATURE and BANDING LATHE
- Others—various sizes—down to 14-in. Swg.

**BIG** Planers
- 138-in.x84-in.x30-ft. POND, 4 heads
- 120-in.x72-in.x18-ft. BETTS, 4 heads
- 96-in.x96-in.x18-ft. POND, 4 heads
- 48-in.x48-in.x14-ft. DETRICK & HARVEY, Open-side
- 36-in.x36-in.x12-ft. CHANDLER, 2 heads
- Others—down to 24-in. x 6-ft.

**BIG** Presses
- 2,000-ton TOLEDO Drawing Press, mtr-dr.
- 500-ton UNITED Forging, Steam Hydrau.
- 450-ton WOOD, Hydraulic Flanging
- 400-ton NILES-BEMENT-POND Hydraulic Wheel Press, Motor-driven

**BIG** Overhead Electric Traveling Cranes
- 35-ton PAWLING & HARNISCHFEGER, 38-ft. 4-in. span, 220 volts D.C.
- 15-ton SHAW, 46-ft. span, 110 V. DC available)
- 15-ton SHAW, 60-ft. span, 110 V. DC

ELECTRIC HOISTS—
- Two 2-ton and )3-ph. 25-cy.
- One ½-ton LO-HED )220-volts

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# EMCO REBUILT

**MILLING MACHINES**

No. 5G LeBlond Universal, m.d.
No. 2 Cincinnati Universal, cone
No. 3 Ohio Universal, cone
No. 3H LeBlond Plain, cone
No. 13B Brown & Sharpe Plain, s.p.d.
No. 15 Garvin Plain, cone
No. 25 Becker Plain, cone
No. 22 Garvin Vertical
No. 56-108 Cinc. Pl. Hyd., m.d., lat. type
C66A Newton 3 spindle Continuous, s.p.d.
Gooley & Edlund Briggs Type
48" Oesterlein Tilted Offset, m.d.
No. 6 Whitney Hand
24" Cincinnati Plain Automatic, belt

**TURRET LATHES AND SCREW MACHINES**

No. 3 Cinc. Acme Univ., m.d., bar equip.
No. 2 Pratt & Whitney, cone
Dreses Brass Lathe, cone
No. 2 Warner & Swasey, cone
No. 3 Foster, cone
No. 4 Woods Tilted, cone
1" Biggs, cone
2x24" Jones & Lamson, m.d., bar
2x26" Pratt & Whitney, cone
2¼x26" Modern, cone
2 spindle Jones & Lamson, Steel Hd., m.d.
3x36" Jones & Lamson Grd. Hd., chuck.
3x36" Jones & Lamson 2 spd. Grd. Hd., ck.
3x36" Pratt & Whitney, cone, bar
18" Libby Type A Geared Head, m.d.
20" Cincinnati Acme, cone
21", 24" Gisholt, cone

**GEAR MACHINERY**

9", 11", 18" Gleason Straight Bevel, belt
No. 1 Lees-Bradner Gear Hobber, m.d.
No. 3-26" and 3-36" Brown & Sharpe, s.p.d.
No. 4-36", 6-60", 6-72" Brown & Sh., m.d.
No. 3H Brown & Sharpe, s.p.d.
No. 5A Lees-Bradner, 14" size
No. 615 Fellows Gear Shaper, helical
No. 7 Fellows H. S. Gear Shaper, m.d
No. 12 Barber-Colman Gear Hobbers
16" Cincinnati Gear Hobber, m.d.
36" Gould & Eberhardt Gear Cutter
Peerless Gear Tooth Rounder, belt
Rochester Gear Tooth Rounder, belt
Gleason Bevel Gear Tester, belt
Glason Gear Rougher, s.p.d.
Schuchardt & Schutte Gear Tooth Rd., belt

**RADIAL DRILLS**

4" Dreses, gear box, 17" col.
4' Fosdick, gear box, 15" col.
4' Niles Full Universal, gear box
4', 5', 6' Niles Semi-Universal, m.d.
4" Fosdick, cone
4' Prentice, cone
4' Dreses, gear box, 15" col.
4' Cincinnati Bickford, gear box
4' Bickford, m.d.
4' American Triple Geared, gear box
4' American Triple Purpose, d.c. drive
4' Ryerson, gear box
4' Dreses, gear box
4' Hammond Jack Knife
4' Carlton Sensitive
4' American Sensitive
4½' Fosdick, gear box
2½' Cincinnati Bickford, gear box
2½' Avey Sensitive

**HEAVY DUTY DRILLS**

20", 22" Barnes All Geared Self-Oiling
22", 26", 28" W. F. & John Barnes
24", 32" Aurora
24", 32", 36" Cincinnati Bickford
25" Superior
25" Weigel
No. 2, 4, 22 Colburn Mfg.
D4 Colburn
No. 310, 314, 315 Baker
3 spindle 20" Barnes Gang
4 spindle No. 2 Colburn Mfg.
4 spindle No. 2 Foote-Burt
4 spindle No. 4 Foote-Burt
5 spindle 24" Barnes All Geared Self-Oil.
6 spindle 21" Hoefer Gang
6 spindle Niles
No. 00S, 1SS Garvin Horizontal
No. 2, 3 Baush Multiple rect. head
No. 7D Moline 2 spindle Hole Hog
No. 15HC Fox, m.d.
No. 18, 30 Natco, rect. head
No. 14 Natco, rect. head
No. 25 Baush Straight Line
No. 26C Fox Tapper
No. 51C Harrington
No. 220 Baker 2 spindle
Natco 2 way Horizontal Drill & Tapper

**BORING MILLS**

30" Bullard, cone
30" Gisholt, cone
42' Gisholt, gear box, 2 heads
48" Niles-Bement-Pond Car Wheel Borer
52" Baush, m.d., 2 heads
7' Niles, cone, 2 heads
10' Pond, cone, 2 heads
No. 4 Niles-Bement-Pond Horiz. 5½" bar
Niles-Bond-P Cylinder Borer, 12" main bar

**PRESSES**

Swaine Horning
Waterbury-Farrell S. C. flywheel
No. 1½ Bliss Cam, geared
No. 2S Consolidated O.B.I.
C2 Ferracute O.B.I.
D2, DD2 Ferracute Drawing
P2 Ferracute Stiles Type
No. 5 Bliss Stiles Type
No. 6 Waterbury-Farrel D.C.
No. 16 Bliss Horning
No. 50-4-36 Minster S.S.
S51 Ferracute D.C.
DG53 Ferracute Redrawing
No. 54A Toledo Special
No. 92B Toledo D.C. geared
No. 93A Toledo D.C., geared
No. 94 Bliss Consolidated
No. 496D Toledo D.C. Toggle
No. 268¼B Toledo D.C. Toggle Drawing

**ROLLS**

10' Niles, belt, cap. 1" plate, drp. end, hs.
24' Niles, pyramid shipyard, type, strong back, steam drive or m.d.

**PUNCHES AND SHEARS**

Cleveland Model EF D.E., belt, 36" throat
Cleveland EF S.E., 36" throat
No. 3 H. & J. S.E., m.d., cap. 1¼" thr 1"

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# MACHINE TOOLS

No. 6 Long & Alls. S.E., cap. ½" thru ½"
No. 6 Long & Alls. D.E., cap. ½' thru ½"

**CYLINDRICAL GRINDERS**

6x32" Norton, m.d.
10x18" Brown & Sharpe, belt
10x36" Landis Integral Cam, m.d.
10x36" Norton, belt
10x50" Norton, belted m.d.
10x52" Landis, m.d.
10x72" Landis, m.d.
12x36" Cincinnati, belt
12"x18" Cincinnati Plunge Cut, m.d.
12x48" Modern belted m.d.
12x72" Landis, m.d.
16x48" Cincinnati, belt
16x52" Landis, m.d.
16x72" Landis, m.d.
20x144" Landis, m.d.

**CYLINDER GRINDERS**

No. 50 Heald, hydraulic feeds
No. 55, 60, 65 Heald

**DISC GRINDERS**

No. 1 Gardner Disc, m.d.
No. 4 Gardner Disc, m.d.
No. 4 Gardner, belt
No. 6 Diamond, belt
No. 6 Gardner, m.d.
No. 20 Gardner B.B. Comb. Disc & Roll
No. 51 Besly, m.d.
No. 120 Gardner Combination

**SURFACE GRINDERS**

Springfield Planer Type, m.d.
18x48" Diamond L.D. Face, m.d.
30x84" Diamond H.D. Face, m.d.
Covel Hanchett Knife, m.d.

**TOOL & CUTTER GRINDERS**

18" Cincinnati Face Mill, m.d.
No. 1, 1½ Cincinnati Universal
No. 1 LeBlond Universal, 2 motor drive
No. 2 Norton, belt
No. 4, 5, 41 Oliver Motor Driven Drill Point.
No. 23 Brown & Sharpe Gear Cutter Grind.
Gisholt Universal, belt
Gleason Cutter Grinder, belt
Gould & Eberhardt Cutter Grinder
Sellers Drill Grinder, m.d.

**GEARED HEAD ENGINE LATHES**

60"x30½' Niles, s.p.d.
60"x27½' Niles, m.d., with m.d. carriage
60"x27' Niles, a.c. m.d.
30" raised in sand to 36"x22' LeBlond, int. geared face plate, m.d.
27"x18' LeBlond, m.d., taper
26"x16' Bradford, m.d., taper
25"x18' LeBlond, m.d., taper
24"x18' Lodge & Shipley Patent Hd., taper
24"x15' Reed, m.d.
20"x14' Hendey, m.d., taper
20"x10' American, m.d., taper
20"x8' American, m.d.
20"x8' Greaves-Klusman, m.d., taper
18"x15' Lehmann, m.d., taper
18"x12' American, m.d., taper
16"x14' American, m.d., taper
16"x10' American
16"x8' American, m.d., taper
14"x6' Prentice, s.p.d.

**PLANERS**

72"x48"x12' Dietrich & Harvey, reversing m.d., 3 heads, box table
60"x60"x12' Niles, belt, 3 hds., box table
54"x42"x12' Gray, reversing m.d., 4 hds.
36"x36"x10' Whitcomb-Blaisdell, belt, 2hds.
36"x36x10' Cincinnati, belt, 3 heads
34"x24"x8' Cincinnati, belt, 1 head
32"x32"x8' Gray, belt, 1 head
30"x30"x10' Cincinnati, belt, 2 heads
30"x30"x10' American, belt, 1 head, b. tb.
30"x30"x8' Pond, belt, 1 head
30"x30"x8' Gray, belt, 2 heads
30"x30"x8' Gray, belt, 1 head

**SHAPERS**

32" Gould & Eberhardt, gear box
28" Gould & Eberhardt, cone
28" Ohio, cone
24" Gould & Eberhardt, cone
24" Cincinnati, cone
24" Barker, cone
20" Queen City, cone
16" Davis, gear box

**CONE HEAD ENGINE LATHES**

15"x8' Sidney
16"x6' Greaves-Klusman
16"x6' Rockford
16"x7' Pratt & Whitney
16"x8' American
16"x8' Cincinnati
16"x8' Monarch
16"x8' Rockford
18"x8' American
18"x6' Schumacher-Boye
18"x8' Hendey
18"x8' LeBlond
18"x8' Mueller
18"x8' Springfield
18"x10' Bradford
18"x10' Schumacher-Boye
18"x14' LeBlond
19"x12' LeBlond, taper
20"x8' American, taper
20"x10' Davis
21"x8' LeBlond, taper
21"x10' LeBlond
21"x16' LeBlond, taper
24"x10' Bridgeford
24"x10' Canada
24"x10' LeBlond
24"x12' American
24"x11' Chard
24"x12' Schumacher-Boye
24-48"x16' McCabe 2 in 1
24"x16' Schumacher-Boye
27"x16' Bridgeford
28"x14' LeBlond
36"x10' Schumacher-Boye

**MFG. LATHES**

No. 5 Niles-B-P. Car Wheel Lathe, new
No. 6 LeBlond Multi-Cut
No. 12 LeBlond Automatic, m.d.
Niles-Bement-Pond Quartering Mach., new
3½x36" LoSwing
3½x60" LoSwing
8" Sundstrand Stub
15"x6' Automatic Threading
18"x8' Chard Production

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Good Condition
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**Brown & Sharpe**
**36" Preferred**

**No. 13 Automatic Gear Cutter**

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One Modern Tool Grinder, manufactured by Modern Tool Company of Erie, Pa. Swing 12", distance between centers 24", largest wheel size 24"x5". In first-class condition. Made to Government specifications in 1918 for grinding 8" shells. We can supply either a 7½ H.P. 1800 RPM motor, or a 10 H.P. 1140 RPM motor, both 220 volt, 60 cycle, three phase. Weight of the grinder about 7500 lbs. Available for immediate delivery.

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**156 GRAND ST. NEW YORK**

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| 4-Station New Britain Auto. No. 452 M.D. | 2 G.&E. 48"x12" Aut. Hor. Gear Cutter |
| No. 3 Kempsmith Plain Milling Mach.C.D. | 8 Vulcan Hand Mills, single spindle |
| No. 3 B. & S. Plain Milling Mach. C.D. | 6 Superior Hand Mills, single spindle |
| 18"x8' Oliver Q.C.G. Lathe C.D. | No. 6 Besley Grinder, belt drive |
| 42" Pexto Squaring Shear M.D. | No. 51-30 Besley Disk Grinder, M. D. |
| No. 1 Niagara Horn Type Press | No. 20 Osterline Plain Mill, C. D. |
| No. 1 V. & O. O. B. I. Punch Press | 3-36" Ingersoll Vert. Rotary Mills |
| 2 No. 2 V. & O. O.B.I Punch Press | 24"x24"x6' Pond Planer, single head |
| No. 3 Adriance O. B. I. Press | 24"x24"x6' Powell Planer |
| 12"x24" Landis Universal Cyl. Grinder | 24"x24"x7' New Haven Planer, single hd. |

*May we send our complete list?* *Your inquiries are appreciated.*

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## GRINDERS

16″x36″ Landis Plain Cylindrical, Self-Contained Motor Drive
No. 11 Brown & Sharpe Plain Cylindrical
No. 33 Abrasive Vertical Spindle Surface, Motor in Base
No. 1 Wilmarth & Morman Surface
No. 78 Wilmarth & Morman Surface

## MILLS

No. 1½ Valley City Universal
No. 3 Cincinnati Univ., (Knuckle)
No. 2 Brown & Sharpe Heavy Plain
No. 2 Rockford Heavy Duty Plain
No. 3 and No. 4 Cincinnati Plain (Knuckle)
No. 3 Hendey-Norton Plain
No. 3 Kempsmith Plain, Vertical & Div. Head
No. 4 Le Blond Heavy Duty Plain
18″-24″ Cincinnati Automatic & Duplex (10) Hand Mills, All Types
8′ Burr Keyseating Mill

## TURRET LATHES

No. 3 Foster Motor Drive, Power Feed to Turret
No. 3 Superior Turret Lathe, Automatic Chucking, Bar Feed
21″-24″ Gisholt Univ.
No. 3 Warner & Swasey Heavy Duty Full Univ 3-⅛″ Hole, Chuck and Equipment
(6) Warner & Swasey Turret Lathes, 14″

## MISCELLANEOUS

No. 452 New Britain 4 Spindle Chucker, M. D. 10′ x 10 Ga. George Ohl Press Brake, Motor Drive
(3) Baush Multiple Spindle Drills, 20x40″ Heads, 8 to 40 Spdles., Very Low Price, Will sell for parts
No. 25½ Foote-Burt Heavy Duty Pro. Drill, No. 6 Morse Taper, M.D.
3′ American and Morris Radial Drills, Motor Drive
5′ Cincinnati-Bickford Univ. Radial, Table, Motor Drive
(3) No. 2 Barber-Colman. Gear Hobbers
No. 12 Barber-Colmans, Long Beds, Rapid Traverse
36″ Fellows Gear Shaper
18″x8′ Hendey - Hamilton Lathes, Taper
24″x12′ Porter Engine Lathe, Q. C. G. Motor Drive
21″x10′ Le Blond Heavy Duty Prod. Lathe
4x60″-72″-84″ Lo Swings, Two Carriages
24″x24″x8′ Gray Planer
36″x36″x12′ Gray Extra Heavy Pattern Planer, 2 Heads, Motor Drive
42″x42″x16′ Detrick & Harvey Openside Planer, M. Dr.
900 Ton Zeh & Hahnemann Percussion Press, M. Dr., 25″ stroke, 16″ die Space, Practically New
20″ Ohio Shaper, Back Geared, Arr. for Motor Drive
16″ G & E Shaper, Cone Drive
6x6″—9x9″ Peerless Shaping Saws, Motor Drive
6x6″ Racine Shear-Cut Saw
No. 308—6″ Espen-Lucas Cold Saw, M. Dr.
2″ Buffalo Armor Plate Bar Shear, Motor Drive
10′x16 ga. Kutscheid Sq. Shear, Gauges, Motor Drive
18″-30″-36″ Rotary Tables, Power or Hand Feed

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28"x12" Schumacher & Boye Lathe, cone drive, double back gear, quick change gears

21x10' LEBLOND Heavy duty Engine Lathe, double friction back gear, quick change gear box with self contained motor drive 220—60—3 ph.

No. 5 Foster Turret Lathe, equipped for bar work, power feed to turret, hand feed to cross slide, chuck capacity 1½"

No. 6 WARNER & SWASEY double friction back geared turret lathe, power feeds to turret and to cross slide

2—24" STEINLE turret lathes, s.p.d. Power feeds to turret and to cross slide, hole through spindle 6¼"

No. 1 MILWAUKEE (KEARNEY & TRECKER) MFG. TYPE PLAIN MILLER s.p.d., working surface of table 37½"x9½"

1½B special MILWAUKEE (KEARNEY & TRECKER) PLAIN MILLER double overarm, motor drive, all power feeds to table, working surface of table 45½"x11½"

No. 4 CINCINNATI HIGH POWER PLAIN MILLER, high power type, c.d. double back geared, working surface of table 64⅛"x16½"

No. 2 KEMPSMITH PLAIN MILLER, built in motor drive, all geared feeds and speeds, working surface of table 45 x 10"

No. 1½ BROWN & SHARPE Universal Miller, c.d., back geared, Spiral dividing head, vert. milling attach., workng surface of table 33" x 7"

No. 2 KEMPSMITH Universal Miller, built-in motor, all geared feeds and speeds, with universal Spiral divid. head, working surf. of table 45" x 10"

No. 1 Ohio Unversal Miller, s.p.d., arranged for motor drive with 220—60—3 phase motor, all geared feeds & speeds, work. sur. of tbl. 39¼"x8½"

Model 3V TOLEDO HIGH POWER VERTICAL MILLER, s.p.d., all geared feeds and speeds, working surface of table 56"x14", machine new in 1925

32"x22"x10' Ingersoll Planer type miller, fixed rail, 3 spindles

No. 12 Pratt & Whitney 2 spindle profiler, geared spindles, work. surf. 12x15"

2—No. 1 Garvin 2 spindle profilers, working surface 12 x 15½"

No. 14 Brown & Sharpe Plain Cylindrical Grinder, 10" swing, 18" grind. lgth.

No. 11 Brown & Sharpe Plain Cylindrical Grinder, 3—motor-driven

10x36" Landis Self Contained Plain Cylindrical Grinder

16x72" Cincinnati Universal Grinder, 3 motor drive

12x36" Cincinnati Universal Grinder, 3 motor drive

No. 260 Heald Rotary Surface Grinder, with 16" magnetic Chuck

No. 14 Pratt & Whitney Vertical Surface Grinder, belted motor drive, with motor and magnetic chuck, working surface of table 40x12"

20" Rockford Shaper, s.p.d.

2—No. 3 Thiel Precision filing and saw. machine, m.d., 220—60—3 ph. mtrs.

**Laurens Bros., 500 Peoples Bank Bldg., Cincinnati, Ohio**

**Parkway 3315**

## BORING MILLS, Horizontal

4-1¾" bar Niles Knee Type.
6" bar Barrett Cyl. Borer

## BORING MILLS, Vertical

42" Bullard, 2 hds., M.D.
60" NBP, M.D., P.R.T.
60" Niles, 2 swivel heads
**60" Betts, M.D.**
84" Niles, 2 hds., motor dr.
10' Pond, heavy duty

## DRILLS, Radial

3' Bickford, AC., M.D.
4' Dreses Univ. M.D. 13" col.
6' Cinci. Bickford, Standard
6' Amer. Univ. S. P. D.
6' Western Heavy M.D.
12 spindle Bausch No. 4 M.T.
3' American, Sensitive.
5' - 6' Amer. Tri. Grd.
6-7' Amer., Tri. Grd.
**4 Spindle No. 2B Edlund.**
4 spindle Henry Wright
3' Prentice, Gear Box M.D.
24 spindle Bausch No. 2 M.T.

## GRINDERS

3"x18" Norton, Self Cont. (7)
6"x32" Norton, Countershaft
**8"x54" Fitchburg Pl., m.d.**
10"x52" Landis Plain.
15"x15"x96" Norton Opens. Surface, M.D.
16"x50" Norton Self Cont.
16"x68" Landis Crankshaft
**No. 6 Bryant Chucking**
No. 3 Landis Universal
**18" Besly No. 26 Disc.**
**18" Badger No. 220 Disc.**
20"x96" Landis Univ. M.D.
**No. 11 Landis Tool & Cutter.**
**No. 55, 60 and 65 Heald Cyl**
**1¼" New Yankee Twist Drill**

## LATHES

12"x54', Seneca Falls, Self C.
14"x6' LeBlond, Q.C.G., T.A.
14"x6' Hendey Q.C.G. Cone M.D.
16"x10' Mona'h L.C.G. Cone.
16"/18"x6' American, Cone
16/18"x8' L. & S. T.A., M.D.
18"x10' South Bend, M.D.
18"x8' S. & B., Q. C. G., Cone, T.A.
18"x8' Lodge & S. Cone.
20"x12' New Haven, T.A.
21"x8' Conradson, Grd. Hd.
24"x12' Putnam Grd. Hd., M.D.
24"x14' L & S T.A., Cone
26"x10' Pond, Q.C.G., Cone.
26"x11' Wickes Heavy Cne
30"x12' L. & S., Cone, Q.C.G.
30"x16' N.B.P. Axel & Journal, Center Drive, M.D.

## LATHES (Continued)

32"x17' Fifield, triple grd.
36"x14' Pond, Grd. Hd., M.D.
36"x16' Putnam, raised 47",
36"x24' Bridgeford, M.D.
42"x20' L. & S. Cone, Q.C.G.
42"x34' S. & B., Grd. Hd., M.D.
42"x30' Johnson Grd.Hd.M.D.
42" N.B.P. Center Dr. Whl.
48"/60"x14' Putnam, Heavy
48"x16' Fifield Cone
48"x36' Fifield, m.d.
60"x34' Putnam, raised to 72"
90" N.B.P. Heavy, Wheel
Peerless Banding Lathe, M.D.

## MILLERS

No. 1½ Becker Univ.
No. 4B Becker Vert.
No. 6 Becker, Vert., Rotary
No. 24 B. & S. 72" table
No. 4 Cinci., Plain
28" Cincinnati Semi Auto.
No. 2 Hendey Cone Univ.
30"x8' Ingersoll, 3 hds.
No. 26 Becker Pl., Cone
**No. 6 Jackson Die Sinkers (3)**
No. 1 Standard Hand.
No. 13B B. & S. Mfgr.
No. 33 Kempsmith Mfg.
Taft Pierce Thread Miller

## PLANERS

48"x48"x12' D&H Openside.
42"x42"x10' N.B.P., 4 hds. Rev. M. D. with 25 h.p. DC Motor
36" Newton Rotary, M.D.
36"x36"x12' Hyerson Opens.
36"x36"x12' Chandler, 3 hds.
30"x30"x10' D. & H. Openside.
27"x27"x6' W. & P., 1 Hd.
24"x24"x12' American
24"x24"x7' Niles
16"x16"x48" Walter Bros.

## TURRET LATHES

1¼x18" P. & W., bar
1"x15" P. & W., bar
No. 3 Cinci. Acme Univ. S. P. D., 3-1" H.S.
No. 4 Warner Swasey — not back geared
No. 9 Bardons & Oliver, 3" H.S.
No 8 Warner & Swasey, 3-1" bar Capty.
2" Gish, 6½ H.S., 2 Cone
28" Gisholt M.D.
3¼"x36" Cinci Acme Geared Head, Bar, (2)
3¼"x36" Cinci. Acme Geared Head, Chucking
3"x36" Pratt & Whit., bar eq
2¼"x24" & 3"x36" J. & L.

## MISCELLANEOUS

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Automatics, 2-½" - 3-½"
Clevel. Model A Sgl. Sp. (2)
1¼"—¾" Gridley 4 spin. Model F (4)
No. 5A Potter & Johnson
Billet Breaking Mach., Ajax.
**Bolt Threader, 2" Landis.**
Broach, No. 2 Lapointe Belt.
**Chucking, Nos. 34 & 23 N. B.**
**Die Sinkers, No. 6 Jackson (3).**
Flanger, ½" McCabe Pneu.
**Gear Cutter, 110" Newton Spur**
Gear Generator, No. 1 Lees-Bradner.
Gear Hobber, 6" Pfauter.
Gear Hobbers, No. 12 Barber Coleman, P.RT. (2)
Gear Hob., No. 3 Farwell 24"
Gear Hob., No. 1 Farwell 12"
**Gear Planer, 24" Gleason.**
Hammer, 600 lb. N.B.P. Stm.
Hammer, No. 2B Nazel, M.D.
Hammer, No. 3B Nazel M.D.
Header, 1½" Acme Rivet.
**Header, 2" Acme, Steel.**
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**Keyseat., Nos. 2, 3 & 4 M&M**
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Pipe Bender, 6" Federal, Type E.
Pipe Mach. 4" Landis, M.D.
Pipe Mach., 8"x12" Williams
**Pipe Machine, 12" Saunders.**
Pipe Mach., 12" Curtis & C.
**Pipe Mach., 2" Bignall Keeler.**
Press, 400 ton N.B.P. Hyd. Wheel", 48
**Press, No.8½ Z & H Percussion**
Press, No. 3A Bliss, Dble. Ck.
**Press, No. 61 Spec. V & O**
Presses, No. 18 Bliss B. & Fl
Punch & Shear, Buffalo, No. 25U Armor Plate, 4"x¼" angles, 1" hole thru 1"
Punch & Shear, No. 26 Pels, 36" throat, Armor Plate, 6x 2" angles, wt. 28,000 lbs.
**Punch 54" H & J No. 2 D.E.**
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Rolls, 8"x¼" H&J No. 2.
Rolls, 12" Corrugating—Heavy
Saw, No. 3 Ryerson Fric. D.C.
Saw, 9"x9" Peer. Hack, M/D.
**Saw, 6" Avey Milband.**
Saw, 6" Gorton No. 2B Inter.
**Saw, 6" Peerless Univ. M.D.**
Saw, 10" Napier Band
Shapers, 20" & 24" Cinci.
Shaper, 24" Gould & Eberhardt
Shaper, 24" Queen City, M.D.
Shaper, 28" Ohio Dreadnaught M.D.
Shaper, 16" Stockbridge Cone
Alligator Shear, Carlin 1-3"Sq.
Shear, 30" Cleveland, No. X.
**Shear, 156"x¼" United, 36" c. 126"x¼" Amer., 22" Gap.**
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Slotter, 20" Betts, D.C., M.D
Slotter, 24" Dill A.C., M.D.

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No. SG 107 Ferracute, dbl. crank, 96", crank 5½"
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No. 58 Niagara, geared, straight side
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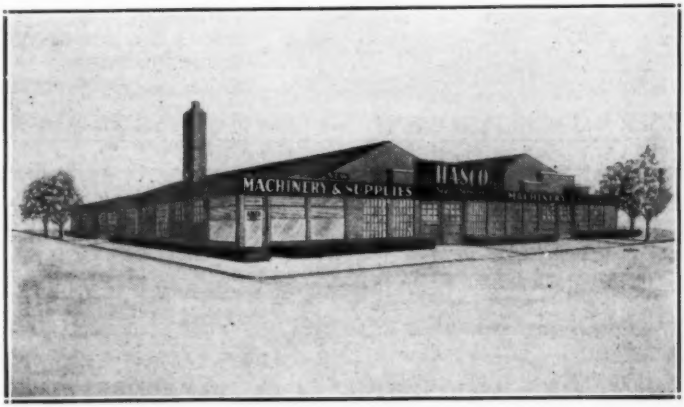


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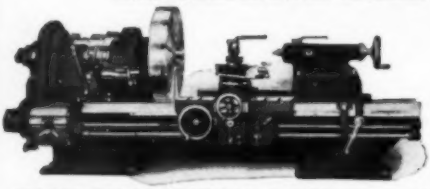

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Reed, 16"x8'
Sidney Production, 12"x5'
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48" x 48" x 16' Pond Planer, H.D. 4 heads, Arr. M.D.

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14"x6' & 16"x6' LeBlond 3 S.C.D. D.B.G.
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25"x16' LeBlond, 3 S.C.D., D.B.G.
20"x8' American, 3 S.C.D. D.B.G.
20"x16' American, 3 S.C.D. D.B.G.
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20"x10' Hendey Cone Q.C.

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New Schuchart & Schutte Hob Grinder (Barg).
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6"x18" Landis Plain, Self Contained.
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48" Bullard Cone.
60" Gisholt, P.R.T.

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## MISCELLANEOUS

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No. 4A High Speed Riveter New.
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**4' and 5' CARLTON ENCLOSED HEAD RADIAL DRILLS, TAPPING ATTACHMENTS. SINGLE PULLEY DRIVE THRU GEAR BOX.**

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16" Superior, H. S., B. B.
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10"—2 Spdle. J. & L. Steel Hd., Covrd. Ways, M. D.
No. 3 Foster Hand Tur., B. G.
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Pipe Thrder, 2½—8" Wms., m. d.
Punch & Shr., No. 55 H. & W.
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3¼" & 4¼" Gridley 1 spdl.
1⅝", 2" & 2¼" Nat. Acme 4s.
1½" Cone 4 spindle
1" & 1⅝" New Britain 6 spdl.
Nos. 24, 33 & 34 New Britain
Gisholt Simplimatics

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Nos. 1, 3 & 4 Lapointe
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No. 3 American rack
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868' Chicago Pneumatic
706' Sullivan
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620' Sullivan
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3' & 4' Dreses radial
3½' Morris radial
3½', 4', 5' & 6' Western radial
6' N-B-P univ. radial
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21", 24" & 28" Cincinnati
Nos. 6D, 11D & 16D Moline
10D Moline cylinder borer
Nos. 17 & 25 Foote Burt
No. 2 Colb., 1, 2, 3 & 4 spdl.
All sizes and makes Sensitive

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26" & 48" B. & S. auto. spur
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Lipe 2 spindle Chamferer
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18", 24" 30" & 53" Gardner disc
24", No. 84 Gardner disc
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8"x38" Manhattan surf.
12"x36" Diamond surface
16"x50" Safety surface
No. 70 Heald internal
No. 6 Bryant internal
24" Ingersoll tub
84" Diamond face
Pratt & Whitney thread
Barber Colman hob

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10"x5' Pratt & Whitney
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13"x6' Willard
14"x8' Lodge & Shipley
16'x6' Cincinnati
16"x6' Monarch
16"x6' Hendey
16'x8' Reed Prentice Grd hd.
16"x9' Lehmann
16"x10' Leblond
17"x8' LeBlond
18"x9' Chard
18"x18' Leblond
21"x18' Leblond
22"x10' Davis
22"x12 Morris geared head
23"x10' Rahn Larmon
24"x10' LeBlond
24"x10' Boye & Emmes
24"x10' L. & S. geared head
24"x12' Lodge & Shipley
24"x16' Boye & Emmes
26"x10' Wickes
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No. 2 Sp. Garvin
21" Gisholt
24" Steinle
3"x36"Jones & Lamson
4"x34" Jones & Lamson
Jones & Lamson 2 spindle
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2¼"x26" Greenlee
2½"x26" Pratt & Whitney
24" Bullard vertical

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42" Bullard, MD, PRT
42" Detrick & Harv. MD, PRT
3" Binsee horizontal
5" Barrett cylinder Boring

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No. 4 Cincinnati univ.
No. 2½ Rockford
No. 4 LeBlond
No. 6 National Transit
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28", 37" & 42" Briggs
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Type 45 Bilton Productomatic
No. 2 Bilton gear
Kent Owens (Toledo)
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**PRESSES**
750 ton Baldwin Southwark triple act. hyd. toggle draw. 142½" bet. uprs., 84" shut height, 550,000 lbs.
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150 ton No. 661 Tol. coin.3"str.
100 ton French Oil Mchy. Co., hyd. press for strhtng. casts.
108" No. 796¼D Toledo Double Crank Toggle Drawing
No. 1½ Bliss Toggle Drawing
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No. DDG54 Ferr. cam draw.
48" No. 6A Bliss double crk. Tie rod frame, roll feed
45" No. 151 Ferr. Dble. Crank
28" No. 71 Swaine dble. crk.
No. 21½ Bliss Consd. OBI
No. 5-I Cleveland O.BI.
Waterb. F. OBI 4½" shaft
No. 6 Bliss ConsolidatedO.B.I.
No. 6 Toledo O.B.I.
Nos. 75&76 grd. Toledo gap
Fremont gap, 75 tons
Wat. Farrell gap, 40 tons
No. P2 Ferracute
No. EG35 Erie punching
No. 94 Bliss Consd. Punch.
Nos. 55, 55½, and 56 Tol. str.
No. 65 Consd., straight side
No. 7 Rockford, straight side
No. 8-7 ZEH & Hn., strt. side
No. 74½ Bliss, straight side
No. 4 Massillon, str. side, grd.

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16" & 24" Gould & Eberhardt
16", 20" & 24" Walcott
16" Kelly
20" Smith & Mills
24" Milwaukee
24" Columbia
24" Cincinnati shaper planer
28" Ohio
36" Morton draw cut

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½", 1", 1½", 2" Landis doub.
1", 1½", 2", 2½" Landis sgl.
1½" Acme double
1½" Geometric
3" Acme

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½" No. 3 Manville SSSD
1½" Acme stop motion
1½" Ajax cont. motion
2½" Ajax suspended slide
4" Ajax suspended slide
4" Ajax original model
No. 1A Ajax forging rolls

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**Saginaw, Mich.**

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30"x16' New Haven Q.C.
24"x12' Boye & Em. Q.C.
21"x10' LeBlond.
20"x10' Boye & Emmes Q.C.
18"x12' Hendey, Q.C.
18"x8' Rahn Larmon Q.C.
16"x8' Lodge & S., Q.C.
14"x8' Lodge & S. Q.C.

**DRILL, RADIAL**

3' Fosdick.

**MILLING MACHINES**

No. 1½ Becker Universal.
No. 2 B. & S. Plain.

**PIPE MACHINES**

6" Oster.
12" Curtis & Curtis.

**PLANERS**

26" x 26" x 8' Fitchburg.
30"x30"x10' Pond.

**SHAPERS**

20" Stockbridge.
20" Steptoe.
24" Stockbridge.

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42" Colburn boring mill, cone drive.
12x52" Landis plain Grinders.
2¼" Greenlee Flat turret, cone.
No. 11, 12 and No. 13 Natco Drills.
Avey 4 spindle, drill, No. 2 m. t.
Avey 6 spindle, drill, No. 2 m. t.
Single spindle Leland Gifford, B.B. drill.
No. 18 Edlund two spindle, B.B. drills.
No. 3 L. & A Gd. Shear, 18" gap, ¼" Cap. 52" long
16" x 48" Landis Crankshaft grinders.
20" Kelly Shaper, B.G. Cone.
10' Robinson Toggle press brake.
3 Spindle Leland Gifford with tapping heads.
3 Spindle Kern. B.B., with tapping heads.
24"x24"x6' Cincinnati planer, 1 head.
20"x10' Monarch lathe, q.c.g., t. a. cone.
18"x8' Monarch lathe, q.c.g., t.a. cone.
30 ton Lucas power forcing press.

**IROQUOIS MACHINERY CO., 660 Ohio St., Buffalo, N. Y.**

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**LATHES**

60"x18' Niles, b.d., 12' centers
54"x16' Johnson, m.d., triple grd.
18"x10' Greaves Klusman, belt dr.
13"x6' Davis (2) tap. att. motorized
16"x6' Hendey, b. d. (no tie bar)

**DRILLS**

4 spindle F. Burt, rail drill, 4 M. T.
20 spdl. Natco, mtr. dr. hd. 14"x27"
3½' Fosdick Rad. gr. box sw. table
10 spdl. Natco, 13½" dia. head, No. 1 taper M.D.

**MISCELLANEOUS**

42" Bullard Vertical Boring Mill, Q.C. feeds, 2 heads
16" Ohio Shaper, swivel table, tilting top, belt drive
6 H.P. Van Dorn 220/440 V. 3 Ph. Buffers 72" long
25-ton Henry & Wright dieing machine
200 Ton Caldwell Hydraulic Wheel Press belt drive

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**Brakes**, hand, 8' 18 ga., 8' 14 ga., (2)
**Drill Presses**, 4 sp. Leland-Gifford & Aveymatic, H. S.
**Millers**, No. 1½B Special K&T double overarm S.P.D.; No. 3 Rockford Rigidmil S.P.D.; No. 3 Kemps. Un.
**Lathes**, 12x5 Hendey M.D. 27"x16 Lodge & Shipley T.A. M.D.
**Grinders**, No. 27 Gardner B.B. op Discs M.D., No. 3 Ohio Tool & Cut.
**Punch Presses**, Nos. 1 to 5 O. B. I.; several straight sided
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4' Ryerson, S. P. D.
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**Slitter**, No. 235A Bliss, 36", S. P. D.
**Slotter**, 3½" Rhodes
**Turret Lathes**, No. 2A & 3A W. & S., complete with bar equip., M. D.

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No. 3 BECKER Vertical

**TURRET LATHES**
No. 1 CINCINNATI-ACME Full Universal, Geared Head, TIMKEN BEARING, M.D. 2½" Spdle.
No. 4 WARNER & SWASEY Univ.
No. 7 FOSTER, Grd. Head, 2½" Sp.
PRATT & WHITNEY Geared Head, 2½" Spindle
No. 4 BIGGS, F.B.G. Power Feed, 1½ Spindle.
26" Gisholt
Nos. 0 and 00 B. & S. Automatic Screw Machines
24" STEINLE Univ. 4" & 6" Spindle

**LATHES**
30"x15' SCHUMACHER & BOYE
25"x10' LE BLOND Heavy Duty
20"x8' AMERICAN; 18"x10' WALCOTT
18"x26"x10' RAHN-LARMON Gap; 18"x16' and 14"x6' HENDEY

**MISCELLANEOUS**
No. 2 B. & S. Automatic Surface Grinders
16"x72" B. & S. Plain Cylindrical Grinder
6' CINCINNATI All Steel Press Brake, ¼" Cap.
RYERSON Universal Iron Worker; Punches, Shears, Angles
GRAY Roller Die Nibbler, 36" Throat, ⅜" Cap.
D & K Power Shear 6', All Steel Const. 20" Gap—14 Ga. Cap. M.D.
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RADIAL DRILLS
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**1959 SOUTH MERIDIAN STREET, INDIANAPOLIS, INDIANA**



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|---|---|---|---|
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| 12—3¾" | A | 34000 | Plain |
| 1 —⅜"-½" | A | 31000 | Plain |
| 2 —⅜"-½" | B | 31000 | Plain |
| 1— ½"—⅞" | A | 32000 | Plain |
| 7 —1¼" | B | 34000 | Plain |
| 2 —2" | B | 34000 | Plain |
| 1 —3" | A | 33000 | M.D. |
| 4 —3" 4 spdl. | M | 33000 | M.D. |
| **Brown & Sharpes** | | | |
| No. 00G Full Auto. | | 6800 | S.P. |
| No. 00 Full Auto. | | 5988 | Plain |
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| 2—⅞" Four Spdl. | | G224G | M.D. |
| **Gridleys** | | | |
| 1—1¾" 4 spdl. | F | 7500 | B.D. |
| 2— ⅞" 4 spdl. | G | 8600 | M.D. |
| 1—1¼" 4 spdl. | G | 10000 | M.D. |
| 4— ¾" 4 spdl. | F | 4400 | M.D. |
| 3—2¼" 4 spdl. | F | 8000 | Plain |
| 1—4¼ Single Spdl. | | | M.D. |
| **National Acme** | | | |
| 2 No. 53 | | 10300 | Plain |

**HAND SCREW MACHINES**

No. 1 & 7 Foster, pl. hd., Auto. Chuck, P.F.
2—No. 4 Foster F. B. G. Pwr. Feed Auto. Chk.
1—No. 8 Foster Wire Feed Pwr. to cross slide
No. 4 B. & S. Wire Feed Pwd. Feed
No. 4 Acme F.B.G. pwd. feed, wire feed,B.D.
14" Gisholt, 21", Gisholt Turret Lathe Univ.B.D.
14—No. 1, 2, 4, W.&S. F.B.G., B.D.

## IMMEDIATE DELIVERY

**24" BULLARD VERT. TURRET LATHE**
**New Era Type Ser. No. 8200**

**DRILLS**

1, 2, 3, 4 spdl. Allen H.S. BB., B.F. ⅞" cap.
1, 3 Spdl. Lel-Gif. 14"Swing, H.S. P.F.,⅞"cap.
Avey 1 spdl. ½" cap.

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No. 1 O.S. Walker Cutter grinder BD.
No. 3 Wilmarth & Marmon, wet surf. Gr.Ch.
No. 3 Van Norman 4"x15" Cyl. M.D.

**LATHES**

So. Bend 13"x5'
So. Bend 13"x6' Gap Pla. Ch. Bd.
Schumacher & Boye 18"x10' Q.C. tap. att.B.D.
Hendey 18"x12' Q.C. S.B.G. chuck, B.D.
Monarch 18"x6" Geared head, tap. att. MD.
Flather 19"x10' Q.C. 2 chucks
Wolcott 36"x18'

**MILLERS**

No. 9 Kempsmith

**PRESSES**

No. 3 R. & K. O.B.I. 2½ str.
No. 4½ Niagara O.B.I. 27 ton
Willard O.B.I. No. 2

**SHAPERS**

Rockford 14" S.G. Vise
20" Steptoe, B. G., vise, C/S

**MISCELLANEOUS**

G. & E. Rope Drop Hammer, 75 lb. cap.
Keyseater No. 2 Mitts & Merrill, equipment
Pratt & Whitney 2 spdl. Profiler

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| | | |
|---|---|---|
| 6"x18" | 10"x50" | 16"x50" |
| 6"x32" | 10"x72" | 16"x72" |
| 10"x18" | 10"-15" gapx72" | 16"x120" |
| 10"x24" | 14"x36" | 18"x96" |
| 10"-15" gapx24" | 14"x50" | 18"-24" gapx96" |
| 10"x36" | 14"x72" | 21"x96" |
| | | 24"x120" |

## BORING MACHINES

No. 2 Barrett, 5" bar, extension bed.

## BORING MILLS

42" Gisholt
52" Gisholt.
54" Colburn.
60" Gisholt, M.D.
72" Bickford.
72" King, motor drive.
72" Niles, Bement, Pond, M.D.
10' Niles.

## DRILLS

1, 2, 4, 6 Spdl. Leland-Gifford.
1, 2, 4 Spdl. Henry & Wright.
No. 25-24" Foote-Burt.
No. 2 Colburn, 3 & 4 Spindle.
No. 4—5 spdl. Foote-Burt.
No. 1, No. 3, No. 4 Baush Multiple.
3' Western Plain.
4' American Plain.
4' Western, motor on column.
6' American Plain
6' Fosdick Plain
6' Western Plain.
7' American Full Universal.
7' & 8' Western heavy.

## GEAR CUTTERS

No. 2, 3, 12 Barber-Colman.
No. ½, Pfauter Hobber.
No. 2 Pfauter Hobber.
No. 3, 4, 5, 6 Brown & Sharpe.
No. 624 Fellows
No. 6-A-72" Cincinnati.
No. 16-HS G. & E. Hobber.
No. 24-HS G. & E. Hobber.
18" Gleason Bevel Generator, m.d.

## GRINDERS

No. 2 Thompson Univ.
No. 2½ Universal (Bath type).
10" Swing Norton Universal
No. 4-12"x66" Landis Universal.
14"x96" Norton Face.

## LATHES

14"x6' American geared head
16"x8' Flather.
17"x6' LeBlond
18"x8' Lodge & Shipley.
18"x12' American.
20"x10' Lodge & Shipley.

## LATHES—Continued

20"x12' Lodge & Shipley.
24"x12' American.
24"x13' Chard.
24"x16' Lodge & Shipley.
24"x18' American.
24"x20' Lodge & Shipley, Taper.
24"x22' Lodge & Shipley, Taper.
25"x10' LeBlond Heavy Duty.
30"x12' Whitcomb-Blaisdell.
30"x12' Lodge & Shipley
36"x16' American, taper.
36"x24' Bradford, taper att.
46"x30' Houston, Stanwood & Gamble, m.d.
20"-40"x10' Rahn - Larmon Geared Head Sliding Bed Gap.

## MILLERS

No. 24 Brown & Sharpe Plain
No. 2 Ford-Smith Universal
No. 5 Brown & Sharpe Vertical.
No. 5-B Becker Vertical.
No. 6 Becker Vertical.
ACS Becker Continuous Vert.
No. 4 Hendey Lincoln.
Type "B" Briggs Lincoln.
No. 12 P. & W. Lincoln.
No. 33 Becker Brainard.
24"x24"x12' Ingersoll Adj. Rail.
36"x36"x12' Newton Duplex.
38"x44"x20' Ingersoll Slab.
72"x16"x14' Ingersoll Slab.
No. 1 Smalley-General Thread Miller.

## PLANERS

24"x24"x6' Cincinnati.
24"x24"x6' Rockford.
24"x24"x12' Gray.
30"x30"x8' American.
30"x30"x18' Cincinnati.
36"x36"x8', 18' Cincinnati.
36"x36"x16' Niles-Bement-Pond.
42"x42"x14' Gray .
48"x48"x10' N-B-P.
60"x48"x20' Hamilton.
72"x60"x16' American.

## PRESSES

No. 01 & No. 1 V.&O., M.D.
No. 1½ V.&O., M.D.
No. 20 Bliss, M.D.
No. 303 Bliss S.S., Geared.

## TURRET LATHES

No. 6-2" Wood A.C. & B.F.
No. 4 Milholland G.H.,A.C.&B.F.
No. 6—2¼" Warner & Swasey.
18" Libby-International, 5" H.S., M.D.
No. 3A Warner & Swasey.
2¼"x26" Greenlee, A. C. & B. F.
3¼"x40' Greenlee, A. C. & B. F.
24" Gisholt, 6¼" H.S.
26" Libby, 7½" H. S., M.D.

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**DRILLS:**
Radial, sensitive, 3' American.
Radial, 3 ft. Foodick.
Natco Type K 20-spdl.
Rail. Foote-Burt Nos. 2 & 4, 4 spdl.
Prentice, 4-spindle.
Allen BB 5-spindle.
Allen BB Type B sgl. spdl.
Demco DAH BB, MD.
36" Cincinnati BG PF SL.
25" Bickford, G. & E.; Sid. Hd., P. F.
20" & 24" Prentice BG.

**GRINDERS:**
Disc, No. 6—20 Besly.
Disc, No. 220 Badger & press.
Drill, New Yankee, D. E.
Internal, Madison: No. 65 Heald.
Surface, No. 210 Heald 8".
Surface, LaSalle.

**HAMMERS:**
50-lb. Little Giant MD.
40-lb. Bradley Helve.

**LATHES:**
24"x14' Niles, P. C. G.
18"x8½' Rahn & Mayer.
18"x8' Lodge & Shipley MD.
15"x6' Flather, S. B. G.
14"x6' Lodge & Shipley.

**LATHES—Turret:**
16" Type A Gisholt 6¼" hole.
No. 3 Foster 14½".
J & L. 12".

**MILLERS:**
No. 25 Becker-Brainard.
No. 3 Becker-Brainerd, plain.
Gooley & Edlund Slab Miller.

**PRESSES:**
Hydraulic, 42-ton Elmes.
OBI. Nos. 0, 2, 3 Loshbough-J.
O. B. I. No. 2 Sidney.
O. B. I., No. 30 Swaine.
Foot Press, No. 4 Swaine.
Arch Press, No. 40 Swaine.

**PUNCHES & SHEARS:**
Queen City DE. ½ in ½", M. D.
Rock River L. ½ in ½"; 24 thr.
Cleveland C. SE. ¾ in ¾", 26" thr.
No. L-10 Badger. DE. ½ in ½"
No. 14½ W.-W., 25" thrt.; m. d.
**SHEARS:**
Jig, GEM, 18 ga. cap., M.D.
Rotary Bevel, Lennox ¾".
Square, Stark 9"; 18 ga. cap.
**THREADERS, Pipe & Bolt:**
Murchey, ¾" dbl. head, bolt.
Pipe, 2" Oster M. D.
**MISCELLANEOUS:**
Bender, No. 15 Wallace.
Dbl. Seamers, Swain.
Compressor, H-B CCB, 14x9x8, 20 HP motor.
Groover, 30" Toledo.
Planer, 30"x30"x8' Pease.
Planer, 30"x30"x8' Wheeler.
Metal Band Saw, 14" Racine.
Roll, corrugating, 10' Robinson.
Rolls, Pyramid type, 10'.
Screw Machine, No. 2 Garvin; No. 2 J. & L.
Saw, cold, Higley 20".
Shaper, 20" Smith & Mills.

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Barrett No. 2 cyl., 5" bar.
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Morris 4' and 5' Radials.
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Upright Drills—many makes and sizes.

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Disc Grind.—All makes & sizs.
Nort., 6x32", 10x36

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Hendey Lathes—most sizes.
Pittsburgh 32"x24', q.c.g.

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V. & O. No. 12, 14 D.A.C. In.
Steil No. 67, s.s.
Bliss Nos. 204 & 304 Straight Sided
Ferracute No. 105 D.A.
Terkelsen D-1 150 t. M. Spring.
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W-F Long. Stroke for shells.
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Bliss No. 16, 4" str., Overh.
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W-F 3000 Ton Hyd. Hobbing

### SCREW MACHINES
Grid. 9/16", ⅞", 1¼" Mod. G.
Clev. ⅝", ½", ⅝", ¾", 2", 2¼", 2½ Auto.
B.&S. Auto.—most sizes (we are specialists).
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Gear generators—Gleason 6" 11"
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Hammer — Standard 800 lb. automatic.
Hammers — Chambersburg 1500 lb. Steam Drop (6)
Headers, many sizes & makes.
Measuring Machines, P.&W. 12", 24" & 48".
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Planer—Cincinnati 56"x42"x16', four head, m.d.
Rolling Mill, Robertson 12"x12" for non-ferrous metal.
Shapers—from 7" to 32".
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Tester—Riehle 50,000 lb. hardness
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**AMERICAN GEARED HEAD LATHE, 36" x22 ft. 16 speed head, geared face plate drive, apron control, arranged for qrd. M.D.**

**Lodge & Shipley** Q.C.G. Lathe, 16"x8', pan bed, taper attachment, std. equipt.

**GIDDINGS & LEWIS HORIZONTAL BORING MILL, 4" BAR, S.P.D.**

**Bertsch Squaring Shear,** 8 ft. 3/4" cap. 24" gap, arranged for geared M.D.

**Milling Machines;** No. 1 Kempsmith, No. 1-1/2 Rockford, No. 2 Cincinnati, Universal.

**Rolls,** Bertsch I.T. drop end, 8' 1/4" cap. G.M.D. 52"-1/4" cap. pyramid, D.E. B.D.

**Brakes;** Chicago Steel Apron Brake, 8' 3/8" cap. G.M.D., 9 ft. 10 ga. B.D.

**Turret Lathes:** Nos. 6 and No. 4 Warner and Swasey; Nos. 3 and 5 Fosters

Many other machines in stock. Send us your inquiries. They will receive immediate attention. What have you for sale?

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**24" swing x12' bed Lodge & Shipley Geared Head Double Drive Crankshaft Lathe.**

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**Has multiple stops on cross and longitudinal feeds for shoulder work.**

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1"x6" Six spindle New Britain Auto. Screw Machine (2)
3/4" Model F. Gridley, four spindle Auto. Screw Machine
No. 0 Brown & Sharpe Auto. Screw Mch.
No. 00 Brown & Sharpe Turret Formers (2)
No. 6 Acme Hand Screw Mch., 2 1/4" cap.
No. 8 Bardons & O. Turret Lathe, 2 1/4" cap.
No. 4 W. & S. Turret Lathe, 1 1/2" cap.
No. 3 Foster, G.F.H. Tur. Lathe, 1 1/4" cap.
No. 2 Warner & Swasey, hand Screw Machine, open belt, 1" cap.
No. 2 Bard. & O. Tur. Lathe, M.D. 1" cap.
No. 1 B.&S. hand Screw Machine, 5/8" cap.
No. 1 Foster hand Screw Mch.M.D. 3/4" cap.
16"x6' Hendey Lathe, Tie Bar Head
10"x52" Landis Cylindrical Grinder
10"x36" Landis Cylindrical Grinder
No. 3 Landis Universal Grinder
No. 84 Gardner Grinder, opposed wheel, M.D.
No. 16 Blanchard vertical Surface Grinder
No. 6 Gardner, B.B. Disc Grinder, 26" Discs, M.D.
No. 6 Rivett Internal Grinder
Two spindle Coulter Diamond Boring Machine, M.D.
29"x15' Schumacher & Boye Q.C.G.-D.B.G. Engine Lathe
18"x8' Bradford, Q.C.G. Engine Lathe
18"x8' Sidney Q.C.G.-D.B.G. Eng. Lathe
18"x8' Mueller, Q.C.G.-D.B.G. Engine Lathe
No. 1A Milwaukee plain Mill, S.P.D.
No. 1 1/2B Brown & Sharpe plain Mill, S.P.D.
No. 2 Brown & S. plain Mill, S.P.D.-M.D.
No. 3 Brown & S. univ. Mill, cone, M.D.
No. 3B Cincinnati, universal Hi-Power Mill, S.P.D.
No. 5B Cincinnati Milling Machine Cone driven Lima M.D.
No. 2 Baker Keyseater, P.F.
No. 0 Baker Keyseater
No. 1 Davis Keyseater
No. 2 Becker Prentice Vertical Mill, B.B.-M.D.
36"x36"x12' Pond Planer, Magnetic reversing machanism, M.D.
4' Reed Prentice Radial Drill, Gear Box, S.P.D.
4' Carlton Radial Drill, Gear Box, S.P.D.
4' Mueller Radial Drill, Gear Box, S.P.D.
5' Western Radial Drill, Gear Box, S.P.D.
5' Bickford Radial Drill, Gear Box, S.P.D.

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652 W. LAKE ST. CHICAGO, ILL.

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REBUILDING

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**PLANERS**

36"x36"x16' Cleveland Openside
48"x48"x16' Detrick-Harvey Opens.
48" Newton Rotary Planer
60"x60"x12' N-B-P Heavy Duty.
30"x42" Newton Rotary Planers

**BORING MILLS**

48" Putnam Car Wheel Bor. Mill
66" N B P Vert. Boring Mill
14'-20' N.-B.-P. Vertical
52" Betts HD Car Wheel
4¼" Bar Sellers Knee Type Horiz.
4" Bar Newark Knee Type Horiz.

**GRINDERS**

No. 6 Bryant Internal Chucking
No. 4 Landis Univ. crankshaft attach.
No. 2 Sellers Tool Grinder
Gisholt Universal Tool Grinders

**LATHES**

30"x13' H.S.G. Heavy Cone Drive
30"x28' N-B-P Bor. & Turn. Lathe
32"x16' Bridgeford, Geared H., M.D.
32"x18' Bridgeford Grd. Hd., S.P.D.
26/46"x20 McCabe, Double Spindle
36"x18' L.&S. B.G. Standard Engine
42"x22' Bridgeford, Grd. Hd, M.D.
60"x40' Wright, two carriages, M.D.
90" N-B-P Driv. Wheel, dble. qtr.

**MILLERS**

12" P & W Automatic Miller
No. 33 B & S Automatic
No. 33 B & S Automatic
24" x 30" x 10' Ingersoll Horiz. Slab Vert. Spdle.

**SIMMONS MACHINE TOOL CORP.**
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**D-31 FOX MULTIPLE DRILL, RECT. HEAD, 16"x31½" spindle centers. Bored for 36 spindles. Has ten 1¼ No. 2 Taper spindles. Power feed to head.**

**AUTOMATICS,** Several Model A Clevelands, from ⅝" to 3¾" bar capacity.
**BOLT CUTTER,** 1¼" Acme single, class A; 2" Landis.
**BORING MACHINE, HORIZONTAL,** 3-B Binsee 2½" bar.
**DIES and EQUIPMENT** to make square cans, including Max Ams double seamer and squeezer and Adriance double seamer.
**DRILLS,** 36" Cincinnati back geared, sliding head, tapping attachment; No. 2 Colburn Manufacturing; 36" Snyder, back geared; No. 4 Quint 6 sp. Turret Drill.
**HAND SCREW MACHINE,** Wells ⅞" capacity.
**LATHES,** Two 20"x10' Davis dbe., back gear quick change. 20"x8' Hamilton dble. back gear semi-quick change. 36"x14' Fifield.
**LATHES,** 38"x14' Fifield — Cheap; geared, quick change; 22"x10' Davis Dbl. B.G.Q.C.
**MILLERS,** No. 3½ Pratt & Whitney duplex 60" table feed 27" between spindles. No. 1 Newton slab, 65" table feed; No. 6 Whitney hand.
**MONITOR LATHE,** 16' Dreses, universal, with chasing bar.
**PLANERS,** 36"x15' Betts, 2 heads; on rail.
**PIPE MACHS.,** 3" Bignall & Keeler, 4" Saunders
**PRESSES,** No. 1 Bliss Cam Drawing Press.
**TURRET LATHES.** Two 21" Gisholt turret lathes, two 3"x36" Jones & Lamson and one 2"x24" Jones & Lamson.

**Many other tools—exceptional "buys"—write for full details.**

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**Established 1894**

# Modern Machine Tools

**BORING MILLS**

Bullard 36″ with side head. m.d.
Bridgeport 36″ M. D.
Rogers 60″ M.D.

**GRINDERS**

1—No. 2 B&S M.D.
1—No. 1 Leblond Univ. Tool & Cutter
1—Wilmarth & Marmon-Univ. Tool & Cutter
1—Frasse Universal

**LATHES**

Reed Prentiss 24″x14″ Geared Head M. D. Taper Att.
Monarch 14″x6″ Motor in Base, Timken Bearings Taper Att.
Lodge & Shipley 18″x8″ Gd.Hd.
LeBlond 21″x8″ Geared M. D.
South Bend 18″x8″ M. D.
LeBlond 16″x8″ M.D. Taper At.
Sidney 18″x8″ M. D.
Monarch 16″x6″
Monarch 18″x8″
Monarch 14″x8″

**MILLERS**

2—No. 33 B.&S. M.D. in Base
2—No. 2A B.&S. Univ. S.P.D.
1—No. 1A B.&S. Univ. S.P.D.
1—No. 4 B.&S. Plain
1—No. 2 B.&S. Universal
2—No. 2 B.&S. Plain
1—No. 2 B.&S. Vertical
1—No. 1 B.&S. Vertical
3—No. 2 Kempsmith- Univ.
1—No. 8 Kempsmith Univ. Table 8½″x40″
1—No. 1 Dow. Plain
1—No. 15 Garvin Plain
1—No. 3 Cin. Universal

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1—G.&E. 24″ Power to head
2—G.&E. 20″
3—G.&E. 16″
1—G&.E. 14″
1—Wolcott 24″ Heavy Duty
1—Steptoe 14″

**TURRET LATHES**

1—No. 3 Cin Acme Universal Geared Head
1—No. 6 Foster Universal
3—No. 3 Foster
2—No. 1 Warner & Swasey
2—No. 2 Pratt & Whitney
1—No. 56 National Acme — 4 Spindles
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**Wish to sell manufacturing business doing light manufacturing with National distribution, well established with approximately five hundred leading jobbers. Investments in equipment, tools, and dies approximately $76,000.00. Total sales this year about $400,000.00, showing approximately $100,000.00 net profit.**

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Cleveland, model A, ⅝", ⅞", 1¼ & 2"
Cleveland, Model C—1¼" Motor Drive
Gridley, Model F, 4 spindle, 1¼, 1⅜, 2¼
National Acme, 3" Model B 4 spindle
New Britain No. 34 & 1⅝x7"

DRILLS, Allen H.S. B.B. 2 sp., P.f. No. 2M.t.
Edlund, No. 1A, 4 spdl. P.f. No. 3 M.t.
Barnes Camel Back 2 spindle
Defiance No. 112 Production, M.D.
Baush & Natco Multiple spindles
Deep Hole Drillers, P. & W. 6 Sp. Vert.

GEAR CUTTERS, Brown & Sharpe No. 4-48"
Cincinnati No. 4-36

GEAR HOBBERS, Lees-B. No. 5A

GRINDERS, Bryant No. 3 Internal, MotorDr.
Heald Nos. 55, 60, 65, 70, and 75
Landis, 10x20" Hydraulic, 30" Whl., M.D.
Landis, 10x24" plain, self contained
Norton, 16x36" Crankshaft
Cincinnati Face Mill, Excello M.D. spdle.
Ohio No. 2 Universal Tool
Wilmarth & M. No. 1 Universal Tool
Hydraulic Vertical Broach, Colonial 36" Str., 54" Daylight, 36"x36" Platen, M.D. like new

LATHES, American 16"x8' Q.C. T.A.
Cisco 14"x8' Q.C.
Hendey, q. c. 16"x8' & 18"x10'
LeBlond, 30"x8' Semi. Q.C.

MILLS, No. 2½ Rockford Plain Type B
Briggs Production
No. 4 Cincinnati Plain, Cone
Pratt & W. 6x14" Thread, M.D.

PLANERS, 36"x44"x10' Cincinnati, 2 heads

PRESSES, No. 73½ Bliss, S.S., S.C., S.F. 3" stroke
15 ton Lucas Forcing
P2 & PG4 Ferracute Solid Back

SHAPERS, 24" Cincinnati & Walcott Cone

SLOTTERS, 3½" Rhodes, M.D. 8" R.T.
5½" Industrial—18" R.T.

TAPPERS, No. 1, 2 & 2X Garvin

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Horizontal Boring Mill 4" dia. bar, table 24"x90", Rotary table 30" dia.
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Milling Machine, No. 2 Rockford Plain, table 11" x 50", Motor Driven
Milling Machine, Kempsmith Production type, table 12"x36", Motor driven
Shaper, Stockbridge 16" Single Pulley drive, power down feed
Shaper, Kelly 16" cone drive
Broach, Oil gear No. 2, Motor driven

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Cleveland 1¼" Model "A"
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Brown & Sharpe No. 00

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Cincinnati-Bickford 4'
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Niles 6' Universal
Silver 3½' Plain
Carlton 3' Sensitive
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12x5; 12x6; 14x6, Geared 14 x6 Tie Bar; 14x6 Tie Bar and Taper; 14x10 Grd.; 16 x6 Tie Bar; 16x6 Tie bar and Taper

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Warner & Swasey No. 2A Turret, Bar Mach.
Boye & Emmes 32x14 Cone, Q.C.G.; T.A.
LeBlond 14x8; 14x6; 19x8
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Lodge & Shipley 14x6; 16x6; 24x16"
Monarch 14x6; 16x6
Rockford 14x6

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350-ton cap.; 54" between rods; 17' distance ram to resistance

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D&K Apron Bending Brake; M.D. 6'x¾" capacity

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6x20 Landis Universal
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**MILLERS**
Brown & Sharpe No. 1½ Plain
Cincinnati Nos. 4, 3, 1½
Kempsmith No. 3, 2 and 1
Ohio No. 3; No. 2 Universal
Garvin No. 2A Universal
Rockford No. 2 Universal
Brown & Sharpe No. 13-B

**GOULD & EBERHARDT SHAPER**
34" stroke
Motor Driven

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Abrasive No. 3 Surface Grinder
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16"x6'
Geared Head; Motor Drive; Complete and in Perfect Cond.

**AUTOMATIC PIN GRINDER**
Arter No. 132—Self contained

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V&O No. 1; 3½; 3; 3½ OBI
Baxendale No. 4 OBI (15)
Niagara No. 3; No. 4
Toledo No. 75; No. 14
Toledo 250-ton Coining Press
Toledo 100-ton Coining Press
V&O No 12½ Dble. Acting Dial Feed
Bliss No. 37½ S.S. Geared

**NO. 1 BLISS TOGGLE PRESS**
Bed area 18x16; 7" stroke Geared; will draw and lift out 3¼" Weight 6000 lbs.
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Acme 42" Power Paper Cutter
W&W 10" Multiple Punch
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Bliss No. 305 S.S. Tie rod Grd. 5" str.
Bliss No. 702 Flat Edge Trimming
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Stoll No. 79B and No. 138B Dble. Crank
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Williams & White 10'6" bed; 7" shaft; 2½" stroke; 175 ton. Wt. 38,000 lbs.; M.D.

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54" Colburn; Vertical Boring & turning Mill; Arranged for M.D.

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Universal Turret Lathe; Bar Feed; 6-speed Geared Hd.; Single Pulley Drive

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GARVIN No. 2 and 3 Duplex Millers, countershaft.
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GRIDLEY 1-¾" 4 spindle automatic, Model F. countershaft drive.
MAC DONALD Style 135 Can Press with strip feed. automatic oiling system, condition equal to new, Serial No. 32003, motor drive.
NIAGARA No. 7-B Geared Inclinable Power Press, 5" stroke.
BLISS No. 74-½ Geared S. S. Press, Tie bar.
BLISS No. 1-½ Geared, D. A. Press.
BLISS No. 21 Inclinable Presses, Roller clutch.
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**2A Warner-Swasey High Hd. Type, No. 6 Brown & Sharpe Turret**

2½" Landis Bolt Threader, Lead Screw, C/S Belt Drive
4" Acme Bolt Threader with 3½" Landis Head C/S, Belt Drive.
No. 9½ Merrell Pipe Machine, Cap. 2½" to 8". A. C. Motor
10"x30" Webster & Perks, 6"x32" Norton, —12"x24"
Modern—12"x48" Cincinnati Cyl. Grinders
13"x6' Willard Q.C.Lathe
18"x6' and 18"x8' American Lathes, G.C.
20"x8' Whitcomb-Blaisdell, Geared Head
24"x12' New Haven, Q.C. Chuck
2-18"x12' Springfield
20"x13' Lodge & Davis, Blocked to 37½"
24"x12' Bradford
3-26"x12' Reed's
42"x20' Lodge & Davis, Blocked to 52"
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4-24"x6' Gray and Ohio Planers,—30"x10' D & H Openside—22"x10' Chandler 2 Hds.
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50-75-200 lb. Hammers
175-A Consolidated press, No. 21 Bliss Press. and Others.
Shapers
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8'x10-Ga. D & K Pan and Box Brake—6" Fingers
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6x6, and 13x16" Peerless Saws.

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62" Niles - Bement - Pond Heavy Duty; 2 swivel heads; Power Rapid Trav.; M.D.
48" Colburn; 2 Swivel heads; S.P.D.

**MILLING MACHINE**

No. 3 Davis Thompson Rotary Mill; M.D.

**LATHES**

60"x34' Putnam; Belt Drive
52"x34' Niles-Bement-Pond; Belt Drive
42"x34' Schumacher & Boye, Grd. Hd.; M.D.
30"x18' Pond; Belt Drive
18"x8' National; Belt Drive
36" Greenlee Double End Center Drive Shaft Turning Lathe; M.D.

**GRINDERS**

No. 24 Gardner Horizontal Disc; Ball-Bearing; 53" diameter
No. 14 Gardner Ball-Bearing Disc; 20" dia.

**RADIAL DRILL AND DRILL PRESSES**

3½' Morris Plain; single pulley gear box drive
12-spindle Baush Multiple Spindle Drill Press; M.D.
8-spindle Natco Multiple Spindle Drill Press; Tight and loose pulley drive
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Leland Gifford Single Spindle Ball-Bearing Drill; M.D.
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**BENDING ROLLS**

Wickes; vertical type; capacity 12' x 1½"; largest roll 23" diameter; 2 smaller rolls 17" diameter

**MISCELLANEOUS**

GEAR CUTTER, 72" Ruesch
HAMMER, 300-lb. Bradley Helve
LATHE, Turret, 3"x36" Jones & Lamson
PIPE MACHINE, 2½" to 10" Standard Engineering Co.; M.D.
PRESS, Power, No. 01 V & O Inclinable; 1½" stroke; M.D.
RIVETER, Hydraulic, 150-ton Chambersburg; 6" stroke
PLANER, 18' Hilles & Jones Plate; ¾" cap.
SHEAR, Hilles & Jones Throatless Geared Slitting; 12" Blades, ⅝" plates, ½"x4" flats

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### TURRET LATHES

No. 9 Bardon & Oliver, 2½" Capacity
No. 9 Foster, 2 13/16" Capacity
No. 6 Warner & Swasey
1" x 6" Acme, Plain Head
No. 1 Brown & Sharpe, Motor Driven

### MILLERS

No. 4A Brown & Sharpe (Heavy) Universal Miller, Vertical Attachment
No. 20 Van Norman, Motor Driven
No. 1 Kearney & Trecker Plain, Motor Drive in Base—Power Rapid Traverse
No. 6 Whitney Hand Millers (10)

### GRINDERS

No. 72 Heald "Sizematic" Hydrau. Fds.
No. 2 Brown & Sharpe Universal
No. 33 Abrasive Vertical Spindle

### SHAPERS

16" Hendey—Gear Box—Arr. M. D. (2)
20" Hendey—Lima Motor Drive
16"—20"—Gould & Eberhardt—C. Dr

### LATHES

14"x6' Hendey—Taper— Draw-bar—Collets—Motor Drive
18"x10' Hendey—Taper—Motor Drive

### PRESSES—LONG—STROKES

No. 10 Bliss—Geared—10" stroke
Nos. 1 & 2 Waterbury-Farrel—Geared 10" strokes
No. 41½A—Waterbury-Farrel—Dial—6" stroke
No. 1 Bliss Toggle—Geared—3"/6" str
No. 3 Rockford—Geared—4" stroke

### MISCELLANEOUS

Planer—36"x36"x10 Gray—Motor Drive
Profiler—No. 12 Pratt & Whitney—Grd.
Shear—3/16"x72" W. F. Fdry.—6" Gap

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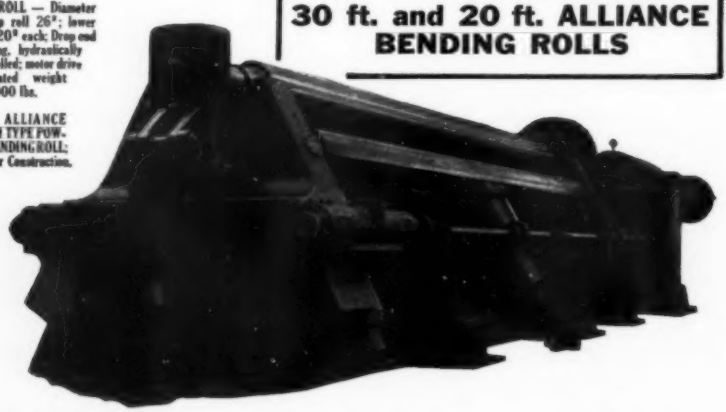
**30 ft. and 20 ft. ALLIANCE BENDING ROLLS**



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**6 Model B 4-Spindle Acme, 3" Capacity**

Cleveland, ¾", 1¼", 2" & 2¾" Model B; 4¼" Gridley; 6 Spindle New Britain—1¼" cap.; No. 00 B. & S.; No 1, 2, 3 Manville

**BORING MILLS—VERT.**

10' Pond, vert. 96" table; 30" and 72" Colburn rapid traverse vert.; 50" Bullard, 2 hds.; 52" Niles, 2 hds.; 30" Colburn

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**No. 300 G. & L. 4¾" bar; Beaman & Smith, 3½" dia.sp. 12" Niles Cyl. Dble. End 7" Bar Putnam-table type;**

**BRAKES, CHGO. STEEL**

Hand—3'16, 4'12, 4'16, 6'16, 8'18, 8'16, 8'14, 10'14, 10' 16, 10'18

Box & Pan—4', 5' 14 ga. 4' & 6' 10 ga. 10' 12 ga., 10'16ga.

Power Apron Type—10' ⅜"—12' ¼"—12' 3/16"—10' 10 ga.—8'12—6' 10 ga. 6' 12 ga.

**ROLLS**

Angle, 4x4¼ G&H, M.D.

Wickes, Pyramid Type, with mtr., Drop End Housing, sizes—18' x1"; 12'x1¼"; 8 ft. ½"Bertsch 10 Ft. Wickes Vert. 1½" cap. 6' Beloit, 3/16" cap. m.d.

**ROLLER DIE MACHINES**

4, 5 & 7 Spindle Yoder

**ROLLER LEVELLERS**

McKay 60"-66"-48"-38"-96"

**SEND FOR CATALOG 404**

**PLANERS**

20' Niles; 26x6 Cincinnati; 60x 60x18 ft. Pond; 30"x30"x10 ft.; 36x30x10 ft' Am. American 21'; 6'; West. 6'; Chicago Steel, Bertach, Niagara, 10' Ft. 3/16".

**MILLERS**

UNIV. No. 3 B. & S.; Kemps. Table 6¼x34"; 3-A Brown & Sharpe M. D.

VERTICAL—No. 2 B&S

PLAIN No. 3-BK & T; No. 3 & 4 Cin. high Pow; No. 5 Le Blond, S.P.D.; No. 0 & 2Y B&S; (3) Kearney & Trecker No. 3 Double Overarm, M.D.; No. 4-B Brown & Sharpe Double Overarm, Motor in base; Rapid Traverse

**LATHES**

18"x16' Monarch Timken bear. Selective Geared Head

American Geared Head Lathes, 24'x12 Ft.; 24"x10 Ft.; 16" x8 Ft.; LeBlond Geared Head 24" x 14 Ft.

Bridgeford 26"x9 ft. and 34"x 16 ft. G.H. 15 speeds

28"x12 ft. Boye & Emmes

16"x6 ft. Hendey-Yoke Hd.

Am. Grd. Hd. 18x8; 24x16; 16x8 Bradford; 18x6 P&W; 30x18, L&S 18"x10' Grd. Hd. M.D. 30' Pit Lathe, 156" face plate

**LATHES—TURRET**

Warner & S.—No. 4, No. 2-A, No. 6; Potter & Johnson No. 6-A

Warner & Swasey No. 2-A Close to 200,000 serial; Foster No. 3 Timken Bearing Geared Head Universal, Hydraulic Feed, Motor in base;

28"x24" Gisholt; 28" Pond

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Pels No. 20, 6"x6x½"; 4x4¼"

Smith No 91-16, Capacity 6"x 6"x½"; with notching attach.

Smith No. 91-13, Capacity 4"x 4"x½"; with notching attach.

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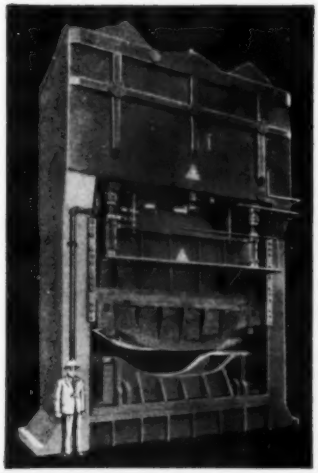

**Clearing Crankless 4-Point Suspension Type Triple Action Press All Steel Frame Construction * Self Contained * Motor Drive*All Gears Enclosed, Running in Oil * All Drives and Ram Adjustments Operated from One Control Board * * * Most Modern Large Press Ever Offered on the Used Market 84" x 133" BED**

**PRESSES, HORN**
Bliss Nos. 39, 40, 21, 83
Toledo Nos. 14, 42, 41A, 43P
No. 55 Toledo
No. 306 Bliss
Billings & Spencer Trimming Press

**PRESSES, Hydraulic**
100 & 200 ton Litchf.

**PRESSES, OB.I.**
Nos. 1, 2, 3, 4, B. G. Bliss
No. 5, 6, No. 6 Bliss Cons.
No. 77 Toledo Open Back Gap Frame
No. 75 Cons. B. G., all V belt M. D. with motors
No. 4 V&O—7" stroke; M.D. Spring Cushion;
Bliss Nos. 20, 21, 102 dbl. crk.

**PRESSES, Straight Side**
No. 80½ Bliss—32" str. M.D., Tie Rod.
No. 4019 Hamilton 800 ton
No. 78½, No. 77½ Bliss
No. 59 Toledo 18" stroke
No. 305 Bliss—6" st. (3)

**PRESSES, Toggle**
**Bliss Nos. 5, 5A. 1½; Toledo No. 26S½-C Toledo, 97" betw. hous. bed 60"x96" —stroke of plunger 29"; 168½" 164; No. 99 Stoll.**

**PRESSES, Double Crank**

**Bliss No. 8 Tie Rod Hamilton, No. 6010½—tie rod 10½" shaft**
**(3) No. 8-D Bliss 12" strk.; 36"x60" bed Air Cush.**
**(2) No. 153-C Bliss, 8" str. 34"x48" bed; 48" ht. die space, Air Cushion;**
**(3) No. 154-G Bliss, 12" stroke; 46" x 84" bed; Air Cushion;**
**No. 94-G Toledo 8" stroke, 42"x84" bed; Air Cush.**
**No. 93-C Toledo 5" stroke, 34"x48" bed;**
**No. 8 Bliss, 36"x50" bed; 8" shaft; Air Cushion;**
**No. 152-B Cleveland, 36" between**
**Hamilton, No. 6010½—tie rod 10½" shaft;**

**PRESS BRAKES**
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No. 12 Pratt & Whitney Profiler
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30"x30"x10' Whitcomb Planer
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No. 14 Natco 16x24 Multiple Drill
No. 30 NATCO 24x40 Multiple Drill
No. 40 Natco Straight Line Mult.Drill
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3' Carlton Sensitive Radial Drill
6' Cincinnati Plain Radial Drill
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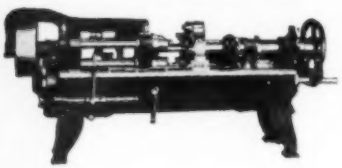
### No. 34 New Britain Automatic Chucking Machine



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Cleveland Model C, 2" (2)
2" Cleveland Model A, S.S. (3)
New Britain 6 sp. 1", m.d. Cutoff (2)
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Nos. 24 and 34 New Britain Chuckers
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Pratt & Whitney dble. end., m.d. & m.
Moline Hole Hog, various sizes (5)
Leland Gifford 2 spdl., p.f.
Fox, Mult. spdl. with tapp. att. (4)
No. 121 Baker Heavy Duty, 2-spindle (3)

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Gisholt Simplimatics, m.d. (2)
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Nos. 5A, 6A, 7A P & J Auto., m.d. (12)
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21" and 24" Gisholt Univ. Turret
3x36 J & L Flat Turret, s.p.d.
14"x7' American
16"x6' Hendey, m.d. & m.

**24"x16' Prentice Lathe, gd. bd., t.a.; s.p.d.**

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No. 21 Brown & Sharpe, Prod., s.p.d.
No. 3V Kent Owens, Pwr. Fd., m.d.&m. Reeves D.
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36"x60"x14' Amer. widened to 60", rail, insd. hd.

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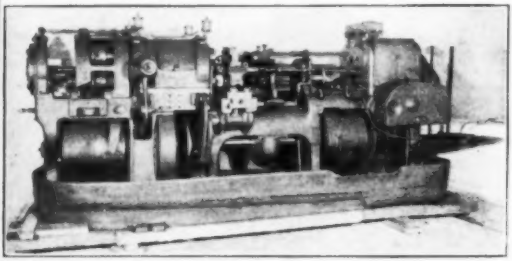

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No. 15A Bryant Chucking, Internal and Face Grdr.
No. 80 Heald Internal
20" Badger face, hydraulic feeds, travel table 44"
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No. 34 Van Norman Internal
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Norton Model B Tur. type, m.d. (2)
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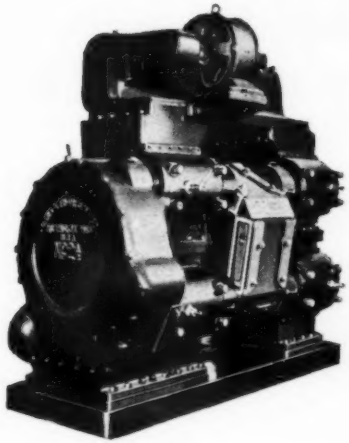

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**No. 2062 Verson Junior Press Brake, Varispeed, drive, motor, 78" bed**

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No. 56 Toledo S.S. Single cr.
Newton Spotting, m.d., 108" bet.
No. 52 Toledo Arch, 29x29 bolster
No. 4 Loshbough Jordan
No. 63 Michigan, S.S.
No. 3½ Toledo, O.B.I., m.d. & m
No. 2½ V & O, O.B.I. dial feed
Clevel., O.B.I., No. 6-I, G.M.D. (4)
Clevel., No. HG, O.B.I., G.M.D. (3)
Canco No. 5, 8" str. s. s., bk. grd., m.d. & mtr.
Toledo, No. 24, cam draw., m.d. & m.
Bliss No. 4A sw., adj. table, m.d. & mtr.
10, 25, 50 ton H. & W. with double roll feeds
P-2, P-3, P-4 Ferracute m.d. (12)
106-53 Fer., S.S., B.G., G.M.D.
Bliss Consolidated Nos. 3, 4, 5, m.d.
No. 6C Rockford dble. cr., S.S.

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6' 10 ga. Bertsch
No. 696 Niagara, 8' 10 ga., m.d. & m.
10' 14 ga. Streine
10' 3/8" Pexto Gap, late type, m.d. & m.
No. 9144, 12' 1/4" Nia. Sq. Gap frame, m.d. & m.
8"x8"x1" Kling Angle, m.d., mtd. on turntable

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1½" Acme, steel bed, m.d.

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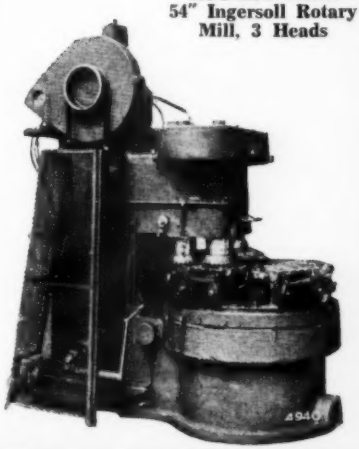
Federal, 125 KVA, motor drive
150 KVA Thompson Butt
Taylor-Winfield Gun Type, Portable
Taylor-Winfield, National Federal, m.d. Butt (12)
Taylor-Winfield 4-way Flash Welder
Taylor-Winfield Federal Thompson Spot (34)

### MISCELLANEOUS

Balancer, 18" Gisholt Static Vert.
Boltcutter, 2 sp., 2" cap. Landis, lead scrw. att.
Broach, V-18 American
Broach, No. 4 La Pointe
Chip Separator, McKenzie, m.d.
Core Blower, No. 6 Demmler, (3)
Die Sinker, No. 2 Pratt & Whitney
Model J Doall Saw, m.d.
Hack Saw, 6x6 Racine
3-ton Automatic Low Lift Truck
Pipe Threader, No. 3 Will., m.d. & m., 6" cap.
Polishers, U. S. Electrical Tool, m.d. in base, 4-brg., h.d. type (16)
Punch, Model ID Cleveland Single End, m.d. cap. 2 holes, 1 thru 1½", 36" throat, latest type
Rivet Heaters, Berwick (4)
Shaper, 24" Cincinnati, b.g.
Shaper, 18" American Hydraulic
Shaper, 16" American Heavy-Duty, m.d.&m.
Static Balancer, 18" Gisholt, a.r., m.d., 4-spd. hd.
Threader, No. 3 Manville, dbl. spdle. auto. hp. fds.
Threader, Rickert & Schafer Horiz. auto. index
Truck, Elwell Parker Elec. Mule

## ROTARY MILL

### 54" Ingersoll Rotary Mill, 3 Heads



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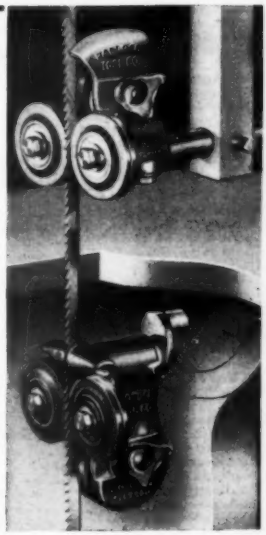


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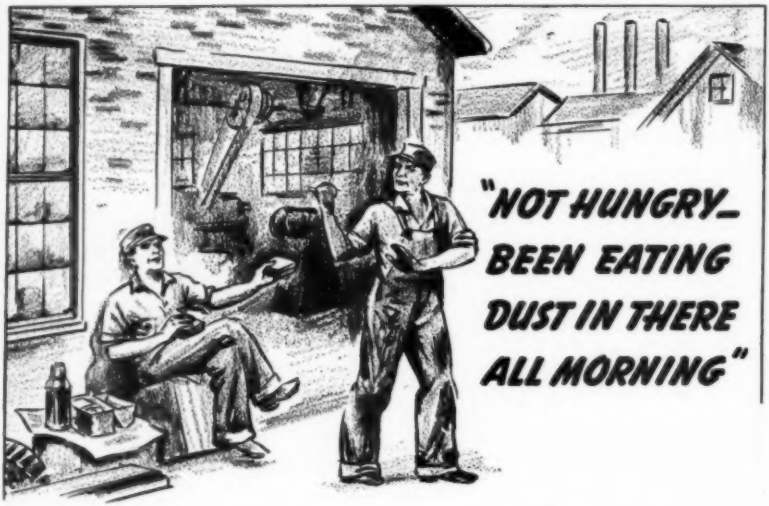


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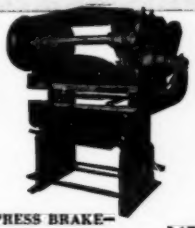

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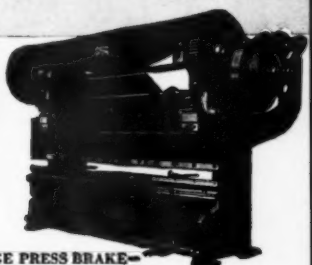

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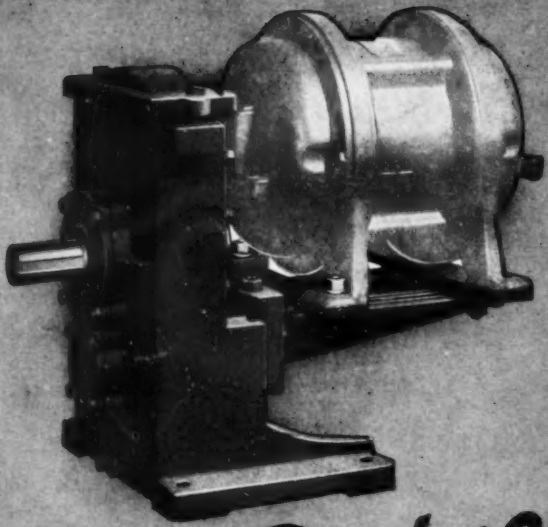

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